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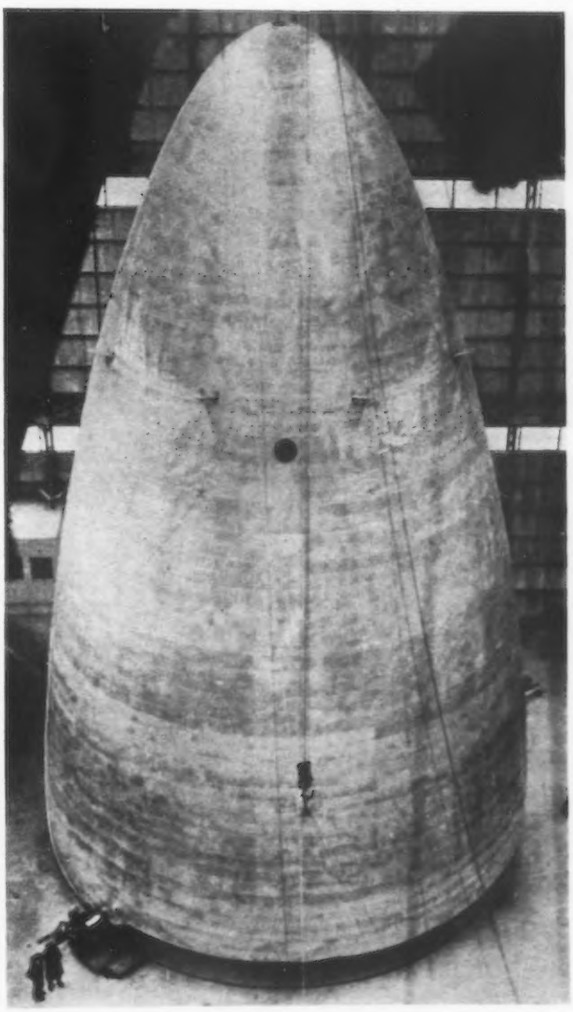
All-Metal Dirigible Has Gas-Tight Sheath Made of Aluminum Alloy Sheet

AS a result of seven years of study and extensive experimentation on scale models, an all-metal dirigible has been constructed for the United States Navy by the Detroit Aircraft Corporation. Special equipment for riveting the thin sheets into a huge gas bag had to be perfected; several novel constructional methods were also devised. Its trial flights are scheduled to begin the week this article is printed.

This Navy dirigible, called the ZMC-2, resembles the Zeppelin type of airship in that it is a rigid ship, built to carry the strains and stresses of flight by means of a rigid hull. However, the means of carrying these shears and stresses have been worked out along entirely different engineering lines.

One fundamental principle enunciated by Count Zeppelin underlies all forms of aerial navigation. In explaining his early experiments with rigid airships, Zeppelin said: "The forces of nature cannot be eliminated, but they may be balanced one against the other." Continuing, he pointed out that ocean steamers are so built that they weigh less than the amount of water displaced by their hulls, and consequently they float above the water. Applying this principle to the lighter-than-air ship, Zeppelin devised a rigid hull so designed that when filled with a light gas it had sufficient buoyancy to lift a cabin suitable for motors, crew and a reasonable pay load, together with surplus fuel for emergencies.

As has been pointed out many times, the German airships were made possible by the discovery of aluminum alloys, which by suitable heat treatment could be made as strong as mild steel (volume for volume) and much stronger than a mild steel piece of equal weight. The skeletons of all Zeppelins have been made of these alloys of the duralumin type (with the exception of the British ship R-101, described in THE IRON AGE, June 27, which used a considerable quantity of stainless steel). Very complicated structural framing has been devised to meet the varying stresses imposed. Main frames are huge wheels, tied together to the center with wire cables. Frames are connected by a series of longitudinal girders, and the panels in the outer surface securely tied by cross bracing.



THE All-Metal Dirigible Grew like a Plant. A riveting machine travelled on a circular track, adding row after row of sheets to the sheathing, one half of the entire structure being lifted one course at a time.

Recent trend in aircraft construction has been toward the simplification of this skeleton. In the all-metal dirigible ZMC-2 this idea has been developed to its logical conclusion. As may be seen from an interior view, the main frames are merely hoops built up of cellular metal girders, and the ship is practically free from internal tie wires. Furthermore, the cross bracings in the outer surface are dispensed with, because the sheet metal sheathing is riveted securely to girders and longitudinals, and is sufficient-

ly rigid to carry the normal shearing stresses in the hull.

Studies of this design developed the facts that not only can an airship be built possessing all of the obvious advantages of all-metal construction but, contrary to common belief, "metalclad" construction in the larger sizes does not weigh very much more than a ship of the same size made with a fabric cover. This is due not only to the fact that the shell or hull plating of the metal airship itself carries the tensile and shear stresses, and reduces the internal framing necessary, but also acts as a gas tight bag. To illustrate the latter point more fully, consider the actual physical structure of the two different types:

The surface of the fabric covered ship consists of five layers (exclusive of framing), from outside to inside, thus:

1. Outer fabric cover with (2) doped coating.
3. Shear wiring.
4. Cord netting.
5. Gas cell fabric lined with gold-beater skin.

These five layers in the fabric covered rigid airship collectively perform the functions of:

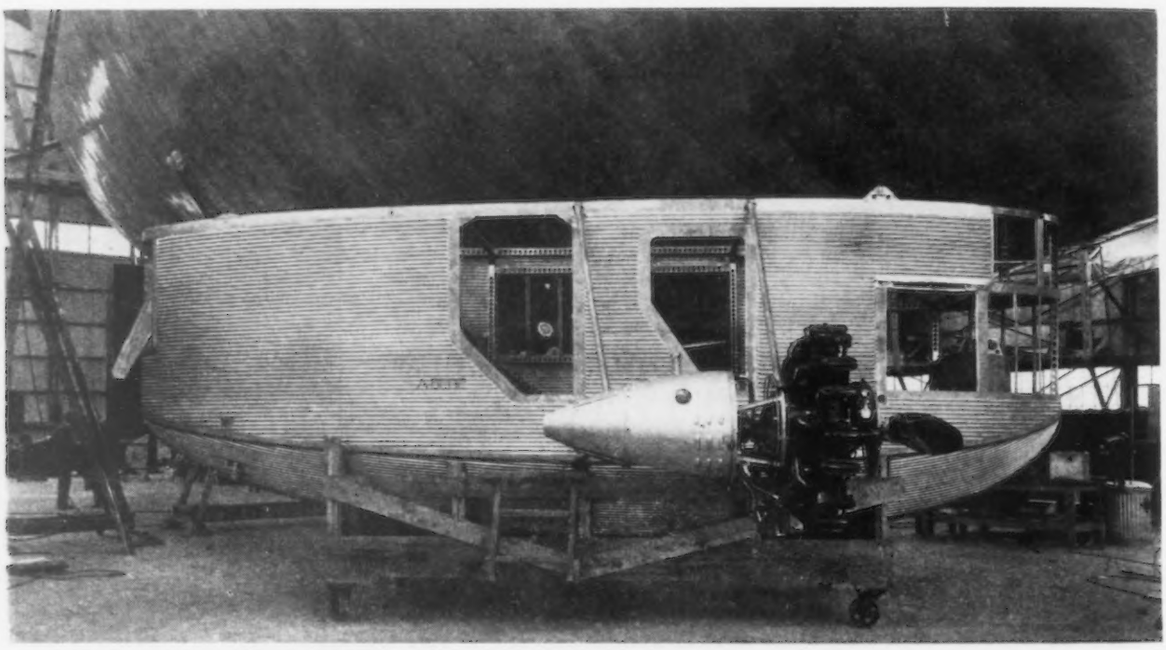
1. Fairing the surface.
2. Protection against atmosphere.
3. Transmission of tensile stresses.
4. Accommodation of pressures.
5. Retention of buoyant gas.

The single metal surface in the metalclad ship performs all these functions and performs each of them with a saving in construction cost.

Riveting Machine for Thin Sheet

It will be apparent that some economical method of joining thin alloy sheet metal into a gas-tight unit is a prerequisite to the construction of any ship having these advantages. A riveting machine described in THE IRON AGE, Nov. 18, 1926, was devised for this purpose, which has successfully driven about 3,500,000 rivets, 0.035 in. diameter, in the ZMC-2, with only one-third of 1 per cent defective rivets. In its operation three strands of wire are fed into the machine like thread in a sewing machine. It inserts and completes 135 rivets a minute, or about 5000 rivets in one hour. The overlap is ½ in.; in this are driven three rows of rivets, 12 to the inch. The cost per lineal foot of seam is about the same as the cost of sewing, cementing and taping 1 ft. of fabric seam. Thus was answered the question of how to put the thin sheets of plating together.

The metal from which the sheathing is made is known as Alclad, 0.0095 in. thick, weighing approximately 0.165 lb. per sq. ft. (including overlap for seams). Alclad is aluminum clad duralumin—that is, a sheet of strong aluminum alloy of the duralumin type, covered on both sides by a thin coating of pure aluminum for corrosion resistance. Nearly all of the other parts of ZMC-2 are also made of this material, which has been used extensively in all-metal airplanes for some time past. There is therefore little of the experimental in its present use; its chief characteristics are uniformity, strength and high resistance to corrosion.



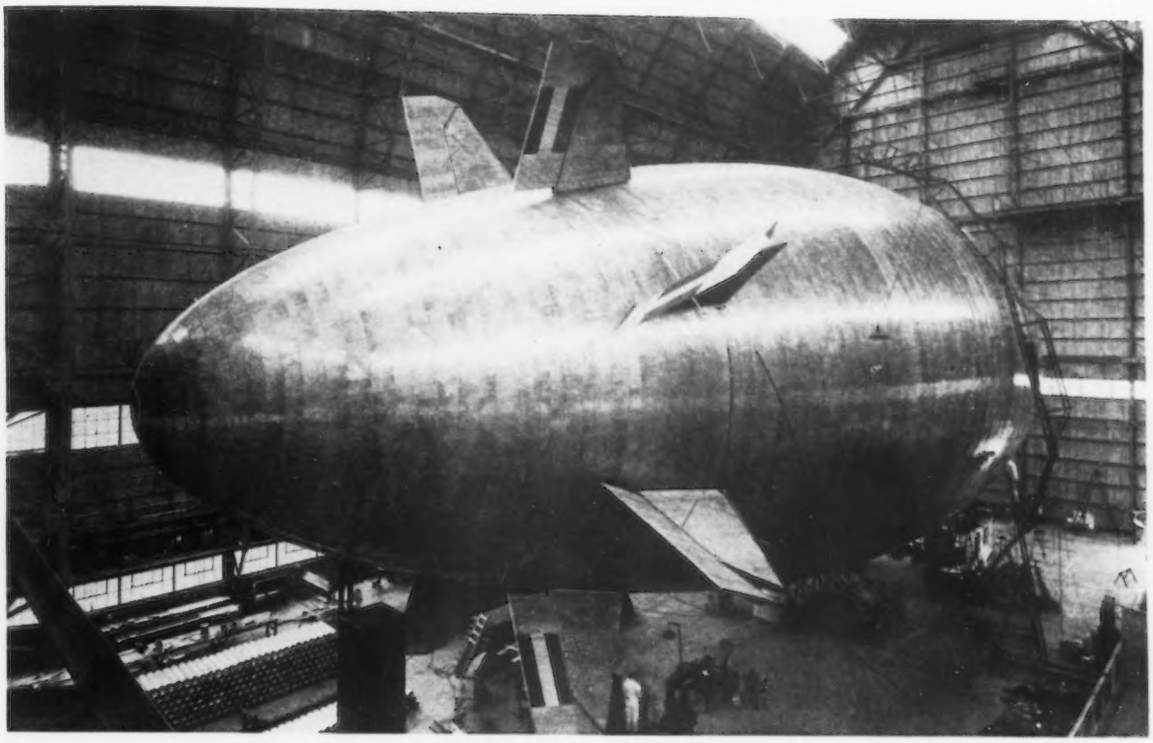
CONTROL Car for Crew of Three, Nearly Complete, Before Attachment to Hull. Dirigible will be driven by two Wright whirlwind motors, 220 hp. each, supported on outriggers one to right and one to left of control car

Development of Design

Some words descriptive of the preliminary work are appropriate.

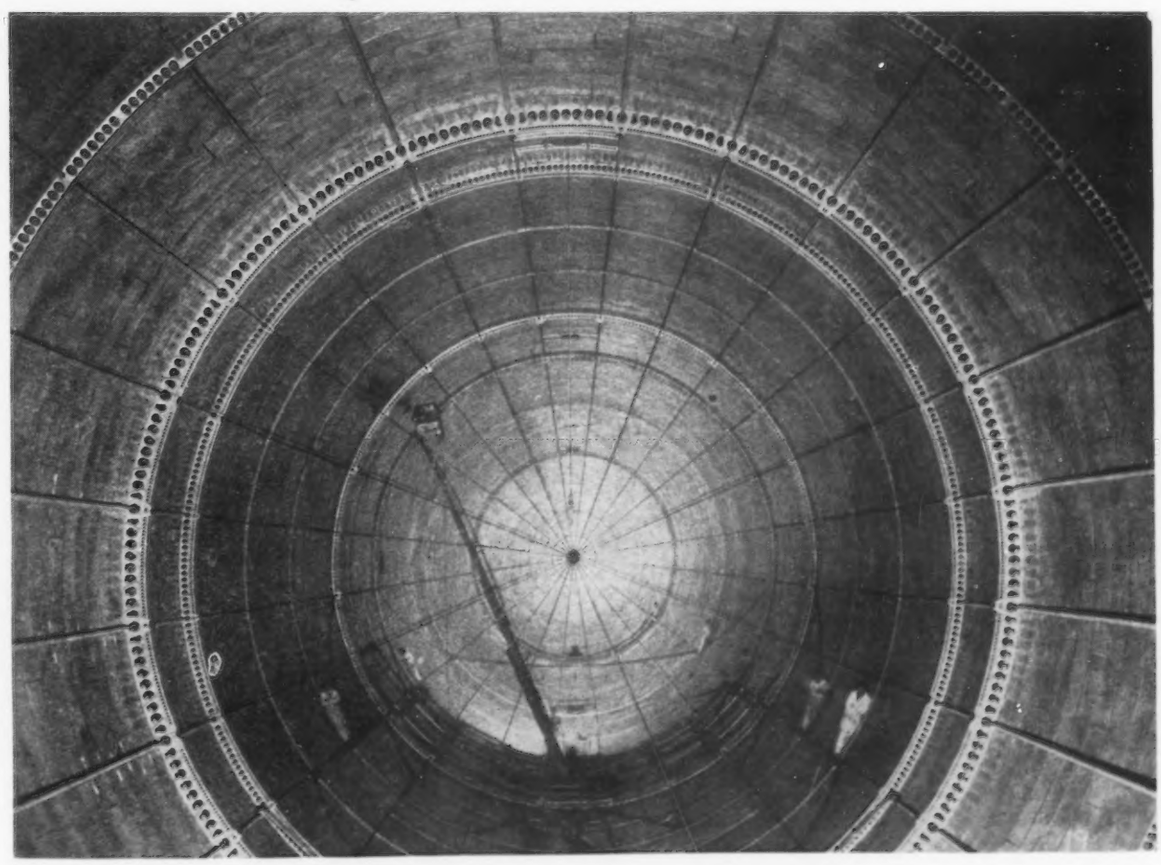
During the great war the engineering and productive skill of many of America's great industries were concentrated on the production of aircraft and aircraft engines, but the readjustment period immediately following the armistice threatened to wipe out the then infant aircraft industry. When the financial and industrial readjustment did not take place as rapidly as anticipated, a group of Detroit men, most of whom were prominently identified with the automotive industry, decided that some definite step should be taken, not only to save the engineering developments of the war period, but to begin a program of scientific research with the view of adapting the principles of military flight to commercial transportation.

In 1922 the Aircraft Development Corporation was formally organized to conduct this investigation. One of the



HULL of ZMC-2 Practically Complete, Looking Toward Prow. Six of the eight control fins are shown; the two at the sides have movements interlocked and act as elevators. The pairs on top and on bottom are rudders

THE Metal Sheath Is Structurally Part of the Dirigible, Taking Shear Stresses Normally Assumed by Intricate Cross Bracing. Note that the interior is comparatively free from tie wires, and the framing of main members and longitudinals is very simple



objectives was the application of the principle of all-metal construction to both heavier-than-air and lighter-than-air craft. At that time there was no metal alloy which could be worked into thin sheets combining the necessary strength with lightness, thickness and corrosion resistance to build an all-metal airship. Several years of experimentation followed.

Among the more prominent concerns assisting in the experimental and research work are: General Motors Corporation, Ford Motor Co., Aluminum Co. of America, Massachusetts Institute of Technology, University of Michigan, University of Detroit and the Detroit Edison Co. Detroit Aircraft Corporation was later organized to construct the ZMC-2 and to engage in other activities connected with aviation.

In the course of the development, metal ships of different sizes were designed in considerable detail and

General Specifications of ZMC-2

Length of hull	149 ft. 5 in.
Maximum diameter	52 ft. 8 in.
Fineness ratio	2.83
Displacement of hull	202,200 cu. ft.
Total ballonet displacement	50,600 cu. ft.
Ratio of ballonet volume to hull volume	25 per cent
Thickness of skin	0.0095 in.
Length of car	24 ft.
Width of car	6 ft. 6 in.
Number of air valves	3
Number of gas valves	2
Number of fins	8
Total fin area	440 sq. ft.
Total elevator area	190 sq. ft.
Total rudder area	95 sq. ft.
Total automatic rudder area	95 sq. ft.
Engines (Wright Whirlwind J-5)	2
Power at 1800 r.p.m.	440 hp.
Propeller diameter (all metal)	9 ft. 2 in.

Forecasted Performance

Gross lift (100 per cent inflation with 92 per cent helium)	12,242 lb.
Weight empty	8,900 lb.
Useful load	3,342 lb.
Crew (three)	600 lb.
Fuel (200 gal.)	1,200 lb.
Oil (25 gal.)	200 lb.
Ballast (50 gal.)	420 lb.
Radio	180 lb.
Passengers and cargo	742 lb.
Range with 250 gal. at cruising speed	680 miles
Maximum possible range (still air)	1,000 miles
Maximum speed at 440 hp.	62 miles per hr.
Cruising speed at 220 hp.	50 miles per hr.
Static ceiling	10,000 ft.

a thorough stress analysis, involving even the integration of all forces as applied to each square foot of the hull surface, was worked out carefully. A large metal model of the ZMC-2 was built to the scale of 1 to 30, and tested at different angles of pitch to verify the theory of the design, of the main bending and shearing actions, and of the factors of safety. Such systematic effort was necessary to develop, mathematically and experimentally prove, the theory of the metalclad airship. This combined research work represents the equivalent of 65 man-years.

Low Fineness Ratio for ZMC-2

The early Zeppelin and similar ships were very long when compared with their width. Some were ten or twelve times as long as they were thick. In the language of aeronautics, the ratio of "fineness," which is the ratio of length to the diameter of a ship, was as high as 10 or 12.

Since that time a general tendency has been to lower this ratio. The Zeppelins of 1918 and 1919 were about 8.6 times their diameters, and the Los Angeles, which is a post-war ship, has a ratio of 7.3.

Careful study of stresses and pressures on the surface of large airships combined with laboratory experiments proves that air resistance of ships with a ratio as low as 5 is even less than many of the long, slender ships.

This fact is due to the discovery that air currents flowing around a body completely immersed in the air have certain influences on long, narrow ships of great size which are not found in ships of shorter and thicker design. Thus the new British ships, R-100 and R-101, being built for trans-Atlantic travel with accommodations for 100 passengers, are about 130 ft. in diameter and 725 ft. long, and have a ratio of fineness of 5.5, the lowest of any dirigible attempted up to the ZMC-2, whose ratio is 2.83.

The designers of the ZMC-2 learned by experiments that rudders and elevators designed to utilize air that is flowing along the surface of a ship are more efficient than those which, placed at the stern, act on air that has already passed the body of the ship. They learned that by placing the elevators and the rudders on the side of the hull some distance from the stern of the ship, greater efficiency and better control could be had with the same surface areas.

It was also discovered that much of the air passing along the surface of a ship does not have any effect on the ordinary type of rudder and elevator. Because of this fact, the ZMC-2 has not the usual vertical rudder and horizontal rudders. Instead, it has a series of eight fins projecting from the hull about 30 ft. forward of the stern. These fins are so synchronized that two on each side act as elevators and two on the top and two on the bottom act as rudders.

In performance, the ZMC-2 will be similar to the non-rigid blimp made of fabric, but as an engineering achievement it is at least equal in importance to that of any rigid airship ever built.

Its size of 200,000 cu. ft. was determined to be sufficient to fulfill experimental requirements of the Navy Department.

After sufficient progress had been made in the underlying engineering work, Congress appropriated $300,000 for the purpose of building this experimental airship. Admiral William A. Moffett, Chief of the Bureau of Aeronautics, said:

"This all-metal dirigible of 200,000 cu. ft. capacity is separate and apart from the Navy's program to construct two airships of 6,500,000 cu. ft. each. It is metal covered, which is, from the standpoint of the Navy, entirely experimental. It incorporates many new and highly technical problems of all-metal construction, which have been developed by well known civilian engineers.

"The construction of this craft was authorized by Congress for the purpose of determining the advantages of all-metal lighter-than-air craft. This particular ship was designed and built in the most convenient size to provide a practical test of all-metal construction and to enable aeronautical engineers to develop the relative advantages thereof."

Summarizing the situation, it may be said that the all-metal dirigible combines three distinct characteristics, none of which have ever been incorporated in a lighter-than-air ship. They are as follows:

1. It will be built entirely of metal, instead of a sheathing fabric which hitherto has been used in dirigibles.

2. It will embody advanced principles in shape, that is, its diameter—50 ft.—will be only about one-third of its length—150 ft.—whereas the familiar Zeppelin type of airships have been from 7 to 12 times as long as they have been thick.

3. Its method of control will differ radically from previous dirigibles. Its elevators and rudders, which regulate its maneuvers up, down and sideways, instead of being at the rear end, will be in the form of eight fins projecting from the hull about 30 ft. forward of the stern.

British aircraft makers have been attracted by the possibilities of the nitriding process. Various parts are being made of it, including gudgeon pins, cylinders, gear wheels, cam shafts, pinions and tappets.

Engineering of Non-Ferrous Metals

Conditions Found in Modern Machines Require Close Specifications and Tests for Properties Now Known Only in an Empirical Way

BY JOHN R. TOWNSEND*



JOHN R. TOWNSEND

THE engineering aspects of non-ferrous metals are of importance when comparing the utility of these materials. The means of accomplishing greater economy in manufacturing operations are often known, but we are nevertheless hampered in the materials available for use.

Precedent has dictated the selection of non-ferrous metals for many years, but recent developments in the mechanical arts have drawn attention to the defects in some old materials and the advantages of some more recently developed. Demands for higher efficiency in the use of these metals requires materials unknown 25 years ago, materials combining great strength with light weight, hardness with toughness, wear resistance with ease of working, and metals having greater corrosion resistance, high endurance limit, heat resistance, improved electrical conductivity and a host of other special properties.

Obscure Causes of Common Failures

The essential requirements of all materials of construction are: strength, hardness, toughness, and elastic properties. These properties may be controlled by specifications employing common and well known tests. Experience has shown, however, that with non-ferrous metals it is especially necessary to control other properties, such as internal strain, fatigue endurance, "directional" properties, (or variations in strength and elasticity dependent upon the direction of rolling and drawing of sheet or rod stock), creep, season cracking, tension properties at elevated temperatures, corrosion and heat resistance. The lack of the proper attention to these properties of non-ferrous metals may result in the selection of a material, which has the desired strength, appearance and workability, yet may be decidedly dangerous to use and result in sudden and even disastrous failure of the parts involved.

Examples of such sudden failure are on every hand. For instance, a shop mechanic may report that a part has failed because it has "crystallized." He is most probably referring to a failure due to "season cracking," fatigue or creep or to a fracture produced at a temperature where the metal loses its ductility. All of these failures will resemble each other in that the fracture will be coarsely crystalline in appearance, due to the path of rupture favoring the trans-crystalline cleavages. It should be noted that each of these failures is due to different service conditions. Some of them are only common to certain non-ferrous metals, or vary in degree with these metals. This further complicates the problem.

Failures Occurring After Stresses Have Been Successfully Resisted

Season cracking, or the spontaneous failure of seemingly sound parts made of some brasses, bronzes or nickel silver, is due to a combination of high internal or applied stress and corrosion. Some non-ferrous metals are entirely free from this trouble; examples are nickel, copper, monel metal and Everdur. Other alloys are only susceptible for a limited range of composition. For example, brass containing 15 per cent zinc or less is free from this trouble. To correct the tendency, finished parts of brass may be annealed at a low temperature (which will relieve the internal strain), or sheet, rod and tube may be "sprung" or bent to equalize the manufacturing strains. Parts made to sustain load continuously and subject to atmospheric corrosion will fail if the conditions are severe enough.

Creep, or the continued movement or flow of a metal under load, is common for lead, tin and zinc at atmospheric temperatures and under moderate loading. Many other metals creep and eventually rupture when loaded at slightly elevated temperatures.

Whereas fatigue failure of steel parts under repeated stressing has been understood for many years and the endurance limit (or stress below which fracture does not occur under repeated loading) for steel is approximately 40 per cent of its ultimate strength, the endurance limit for some of the non-ferrous alloys has been found to be as low as 12 per cent of its ultimate strength!

Some non-ferrous metals have brittle ranges at elevated temperatures. For example, annealed high brass sheet has practically no ductility at 600 deg. Fahr., and will break easily at that temperature, revealing an intercrystalline fracture.

These various types of failure can be prevented either by selecting metals that are not subject to these troubles or by so proportioning each design as to eliminate them, at least within the life of the part.

At present our understanding of such common properties, as wear, punching, drawing, forming, welding, soldering, brazing and riveting, is mainly empirical, for we have as yet acquired relatively little systematic knowledge of these properties of non-ferrous metals.

Economic Factors Govern Use of Special Alloys

In addition to the above-mentioned properties concerned with *use* of these metals, there are a number of economic factors that must be taken into consideration when a metal or alloy is to be used in quantity and in a commercial manufacturing operation. These are cost, source of supply, uniformity of quality and the degree

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to which the metal may be controlled by specifications.

The cost of the metal must be consistent with the use to which it is being put. When possible the source of supply should be wide spread, domestic, competitive and reasonably free from interruption. This ideal can not always be met, because nature has not provided us with unlimited and widespread domestic sources of supply of metals. Metals are bought in a world market, and this may sometimes cause the abandonment of native mines in favor of sources abroad which are richer and cheaper to work. For example, tin and antimony, which are extensively used in non-ferrous alloys are imported from abroad—tin from the East Indies and antimony from China.

Competitive sources of supply are necessary to obtain favorable prices. Here again, competition may be impossible. Then the force of other considerations must be great enough to overcome the objection to relying upon limited sources. Generally speaking, the newer alloys of exceptional and widespread utility are the result of long continued research activities by their inventors and are necessarily of higher price and limited source. The general policy of their producers, however, appears to be to market these alloys at but a slight increase over the cost of the ingredients, the increased demand for the base metals being considered an adequate return.

Rigid Specifications Necessary for Mass Production

The matter of specification requirements is also becoming one of increasing importance. It is absolutely essential that supplies of non-ferrous metals be uniform in quality, shape and thickness; if otherwise, design and manufacturing difficulties will arise. Modern high-speed production methods depend upon a careful set up of machinery and this in turn upon the continuous flow of uniform material, if the dimensions for formed, punched, drawn, welded and forged parts are to be sufficiently interchangeable, and high-speed production unhampered. Adequate supply consequently requires an intimate knowledge of the properties of metals, a thorough revision of our old methods of test and the creation of new ones to control more accurately these useful properties. Materials specifications, if they are to be wholly effective, to meet the requirements of uniformity, must contain in addition to specific requirements, methods for inspection and sampling. This is leading to a more general use of statistical methods of quality control as a means of guaranteeing the economical use of materials in high-speed production.

Surface Seams in Rails Cause of Crescent-Shaped Base Fractures

As a sequel to a fatal derailment in 1928, James E. Howard, engineer-physicist of the Interstate Commerce Commission investigated the occurrence of seams in the base of rails. The accident in question was the result of a fracture from that cause. His remarks are summarized below.

Base fractures are commonly progressive, not immediately forming in new rails, but with an interval of time elapsing between their incipient formation and final rupture. They originate at a longitudinal seam in the lower surface of the base, thence gradually extending upward. A crescent-shaped piece of the base is eventually detached. The final stage of complete rupture is reached by the upward extension of the fracture from the base of the rail, traversing upward through the web and the head.

It has been the experience in the examination of crescent-shaped base fractures that such fractures invariably started at a longitudinal seam. In some cases the seam was several hundredths of an inch in depth and displayed blue-black walls. Such a seam or lap was made without doubt during the fabrication of the rail. Other explanations have been offered for the presence of some of these manifestations. Short, intermittent lines have been attributed to the breaking through of small blowholes which had formed near the surface when the ingot was cast.

The presence of surface seams covering a portion of the periphery of the head and a portion of the base led to the introduction of a deseaming process which at least removed the seaminess at the particular pass at which it was done. Diagonal rolling has been given consideration in the fabrication of rails.

Structural shapes display similar seaminess, often much exaggerated, and in which there is a relation between the location of the seams and the roll designs in which the shapes were formed. Seams are found at definite places in rolled angles, channels and beams, especially in the latter in pronounced degree.

Influences which lead to the formation of surface seaminess appear to cause different results on different occasions. Some rails are nearly free from seaminess, whereas others are very much affected, too seamy to justify putting them into the track.

Tests of bases of rails, by crosswise bending the flanges, display a high degree of strength, apparently in excess of service requirements. Such results, however, furnish additional examples of the remote relations between primitive static tests and the endurance to repeated strains of service. Variations in the state of seaminess of the bases of different rails, from those nearly immune and those extremely charged with numerous and deep seams, would appear to indicate that some control of conditions at the mill was possible during fabrication which would restrain their formation.

Short sections of rails from each of several rail mills were pickled in hot acid and their bases photographed. The results were not all the same in degree, but from no source were the rails presented of complete exemptions from base seaminess. General experience leads to the belief that fluctuations would be found if the tests were repeated, but substantially the same results would be reached.

A sharp reentering angle, as well known, is a menace to all grades of carbon steels which are exposed to repeated stresses, and especially alternating stresses. It is probably safe to say also menacing to steels exposed to shocks and vibratory stress.

Iron ore has been stripped and mined by steam shovels for years on an enormous scale. As a whole, operation is on a greater scale than that at open-pit copper mines, but no single iron mine handles nearly as much material as the Utah Copper Co. at Bingham, Utah, and few of the iron mines handle as much as the other open-pit copper mines. However, the removal of up to 21,000,000 cu. yd. of capping and 35,000,000 tons of iron ore in a season of eight months with 300 to 400 power shovels in operation and standard transportation systems is a great feat.

Electrifies Superior Strip Mills

Hot Rolling Mills Are Centralized and Equipped with Electric Drive with Minimum Loss of Production and an Increase in Capacity

BY H. H. WRIGHT*

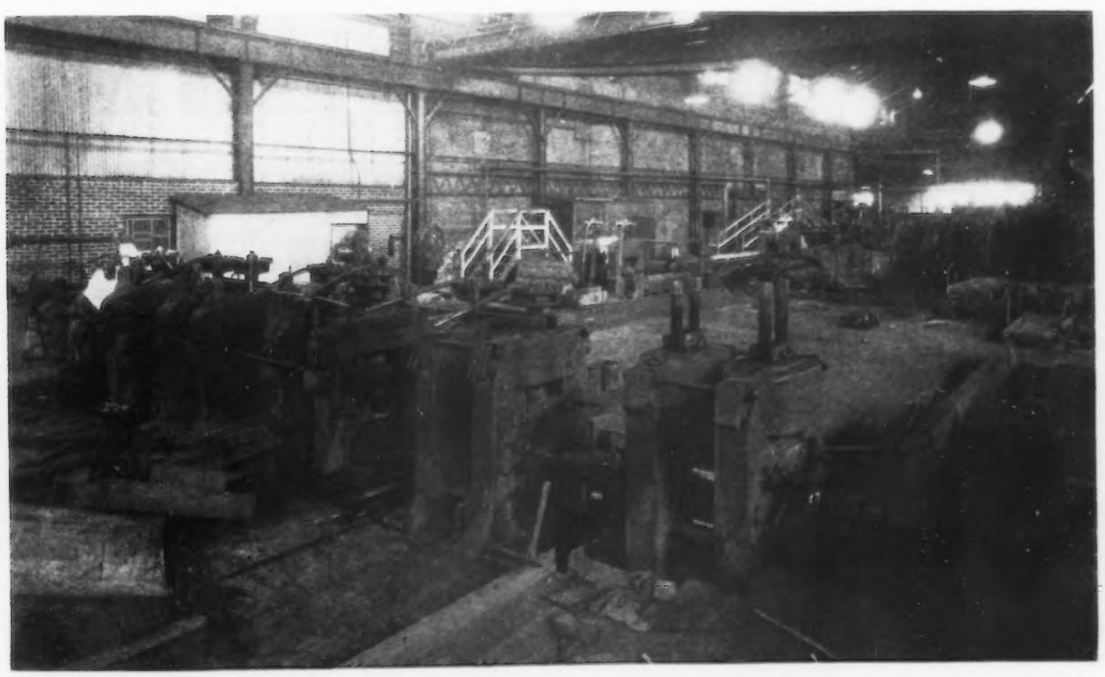
CENTRALIZATION of hot mill production in a group of mills which could be equipped with modern electric drive and otherwise adapted to the company's needs has been accomplished by the Superior Steel Corporation, Pittsburgh, at its Carnegie, Pa., works, with a minimum of expense and loss of production. With a growing demand for the strip steel products in which the company specializes, an increase in hot mill capacity had become imperative. With the exception of the 10-in. mill, all the hot mills were steam driven and the steam equipment had become uneconomical to operate. In making the changes the older steam mills were kept intact for use in emergencies and to help out in times of peak demand.

The 10-in. mill is an electrically driven unit, consisting of a 20-in. rougher, a vertical edger, a 10-in., three-stand intermediate train and a two-stand, 10-in. finishing train. The capacity of this mill was limited by the drive on the finishing train, which was an induction motor with no provision for speed adjustment. Near the 10-in. mill was a steam driven 14-in. mill, which was in good condition but uneconomical to operate because steam for the engines was supplied from an isolated boiler house on which the labor cost and standby losses were high.

It was decided that, by modifying the 14-in. mill slightly and replacing the engines with motor drive, practically all the requirements for heavy strip could be handled in this mill and that, by replacing the 10-in. mill finishing train drive with an adjustable-speed motor, the capacity for rolling medium widths could be increased satisfactorily. With the installation of a new electrically driven 8-in. mill, the hot mill capacity for narrow, medium and light-gage material could be rounded out and make it possible to shut down a steam-driven mill. This program was carried out and has resulted in an increase in hot mill capacity and reduced operating costs.

The modified 14-in. mill, shown in an accompanying illustration, consists of a 20-in., three-high breakdown stand in tandem with a 14-in., two-high flat pass and two vertical edgers; a three-stand 14-in. intermediate train, and a 14-in., two-stand finishing train. The original drive consisted of two engines, one of which drove the intermediate and finishing stands as a single five-stand train. The roughing mill engine was direct connected to the first

*General engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.



THE 14-in. Mill as Seen from Finishing Side. The motors driving the edgers and intermediate stands are located in the motor room on the left. The drives for the roughing and finishing stands are in houses on the right

14-in. flat stand and drove the breakdown stand and vertical edgers through a rope transmission. To give greater flexibility the rope transmission on the edging stands was eliminated and individual adjustable-speed drive provided for each stand.

The breakdown stand and first flat stand could be driven satisfactorily by a 1500-hp. constant-speed motor, so the 1500-hp., 352-r.p.m. motor was taken from the finishing train of the 10-in. mill and connected to the first flat pass through a helical reduction gear unit which has a ratio of 352/120 r.p.m. The old engine shaft, flywheel and rope sheave and rope transmission to the breakdown stand were retained. The engine base and main bearing were entirely removed and a new pedestal installed to replace the main engine bearing. The gear unit and motor were mounted partly on the old engine foundation and partly on a new foundation, and to correct for possible misalinement of shafts due to unequal settling of foundation, flexible couplings were used on both the high and low-speed sides of the gear unit.

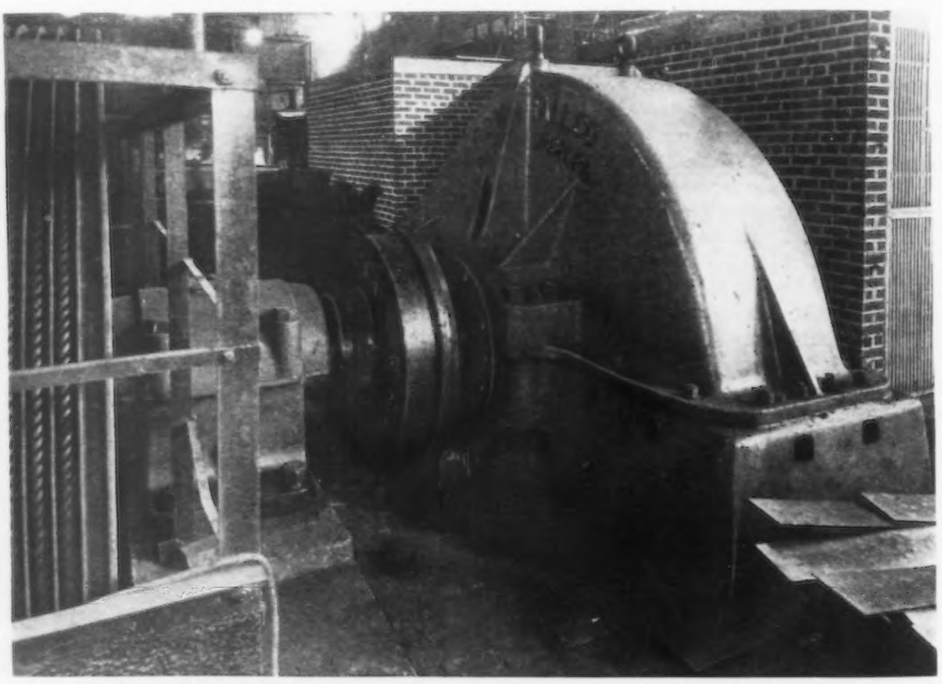
The vertical edging stands are each driven by a 300-hp., 600-volt, 600/1200 r.p.m., direct-current motor through a helical gear unit. All gear units, both for the edging rolls and the 1500-hp. main roll drives, have roller bearings.

The 14-in. intermediate train required a constant speed drive, and a 2000-hp. 180-r.p.m. direct-connected synchronous motor was installed. To allow adjustment for variation in roll diameter and draft, the two 14-in. finishing stands were equipped with a separate set of pinions and coupled to a 2000-hp., 600-volt, 200/360 r.p.m. direct-current motor. To replace the 1500-hp. motor, which was moved from the 10-in. mill finishing train to the 14-in. unit, a 1500-hp., 600-volt, 325/450 r.p.m. direct-current motor was installed.

The 8-in. unit has five stands and is equipped with two sets of pinions to allow the use of two motors. The roughing stand, intermediate stand and two edging stands are driven by an 800-hp., 450-r.p.m. synchronous motor and the finishing stand by a 500-hp., 600-volt, 400/600 r.p.m. direct-current motor.

Electric power for the entire plant is distributed about the plant at 2200 volts. The existing substation and motor room at the 10-in. mill was enlarged to house all the new switching equipment, the 2000-hp. synchronous motor, the 300-hp. edger motors and gear units for the 14-in. mill and the 2500-kw., 600-volt, three-unit, synchronous motor-generator which supplies 600-volt direct current to all the adjustable-speed motors. Direct current is distributed from the station at 600 volts through overhead cables, and the alternating-current motors, not located in the main substation, are supplied through 2200-volt, three-phase feeders.

The arrangement for generating at a central point all the 600-volt direct current required for a number of mills is ideal where the drives are not widely scattered. With this arrangement advantage can be taken of the fact that all motors are not fully loaded at one time, thus reducing the capacity of the generators. In this installation the combined capacity of all the 600-volt direct current motors is 4600 hp. and they receive power from a motor-generator of 2500 kw. capacity.



THE 1500-hp. Gear Unit on the 14-in. Mill. The bearing next to the rope sheave is located in the position formerly accepted by the engine main bearing

For the sake of simplicity in the control it was desirable to have the 800-hp. and 2000-hp. synchronous motors started by connecting them directly to the 2200-volt line without the use of auto-transformers or reactors. In the case of the 2000-hp. motor this method of starting would impose a sudden load on the system greater than the total plant load had previously been, which would affect the voltage of the entire system. This surge is practically eliminated by a very simple procedure. Before starting the 2000-hp. motor, the 2500-kw. synchronous motor-generator is started with no line disturbance by means of an auto-transformer. The set is brought up to speed, synchronized and full excitation applied. The 2000-hp. motor is then started at full voltage and, because of the effect of the motor-generator, which acts as a condenser, the resultant demand on the 2200-volt system is reduced to a low value.

The contract for the electrical equipment, gear units, couplings, pedestal bearing to replace the main engine bearing on the 14-in. mill, for the machine work involved in removing the engine crank disk and grinding a new journal on the engine shaft and for the labor and material was given to the Westinghouse Electric & Mfg. Co.

Germany's Electric Steel Furnaces

There Are Now 56 Arc and 13 Induction Units—Arc Furnaces More Popular — Operating Features of Both Types

A SURVEY recently completed by St. Kriz, in *Stahl und Eisen*, March 28, 1929, pages 417 to 425, under the auspices of the Verein deutscher Eisenhüttenleute, reveals the fact that there are 56 arc-type electric steel furnaces in operation ranging in capacity from 0.3 to 15.4 tons. There are also 13 induction furnaces of from 2.5 to 10 tons capacity.

The apparent popularity of the arc furnace over the induction type is probably due to its greater flexibility in the matter of material charged, long life, and better power characteristics.

Bottom contact, which in the early days of the industry was hailed as a forward step, is becoming obsolete. Only three of the 56 arc furnaces are so equipped.

The various essential features of the comparison, briefly enumerated, are as follows:

Size: As in the United States the most widely used are those from 2 to 8 tons capacity.

Transformer Rating: This varies uniformly with the size of the charge, being about 750 kva. for the 2-ton furnace and 4000 kva. for the 16-ton.

Furnace Voltage: For the small furnaces the voltage impressed during melting and refining runs about 80 to 100. In the larger units (12 to 15 tons) about 190 volts are used in melting and 120 in refining. In contrast to these figures which are for basic practice, furnaces running with acid slags may employ slightly higher voltage, due to the lower electrical conductivity of the slag. Variation in voltage is accomplished by taps on the primary or by changing from delta to star connections or both.

Reactances: Most installations contain reactance coils on the high-voltage side of the transformers, in order to steady the arcs and prevent surges in the circuit.

Hearth Dimensions: The cubical contents of the furnace below the working level are approximately 0.2 cu. meter per ton (about 7 cu. ft.), with a slag surface of about 0.5 sq. meter per ton (about 5.5 sq. ft.). Maximum depth of the bath is about 2 ft.

Hearth Material: In the basic furnaces, either magnesite or dolomite is used. In a few cases silica brick are used above the slag line, and in about a third of the furnaces a quarter or half-course of firebrick is used between shell and lining. The average life of the dolomite walls is 74 heats and of the hearth 416. For magnesite these figures are about 50 per cent greater.

Roof Material: Silica brick roofs of 10 to 12 in. thickness are almost universally used. Life of the roof varies from 23 to 138 heats. Expressed as pounds per ton of charge the consumption of silica varies from 3 to 50.

Cooling: Opinion is divided as to the economy of water cooling, except of the electrode clamps. Certain plants use water-cooled doors, door frames or roof frames. Others find the increased heat loss and repairs exceed the savings in materials.

Electrode Consumption: In 33 furnaces carbon electrodes are used, the average consumption being 32 lb. per ton of cold charge and 17 lb. per ton of steel with liquid charges. The Söderberg (self-burning) electrode is used in 5 furnaces, and is consumed at the average rate of 44 lb. per ton of solid charge. These are employed mainly for the larger sizes (15 to 17 in.), where the consumption of solid electrode is slightly higher than 44 lb. per ton.

Graphite electrodes are used by 23 furnaces, showing the following average results:

	Lb.
Per ton of cold charge	16.3
Per ton of hot charge	6.6
Per 1000 kwhr	17.4

Power Consumption: The rate of use of electrical energy during melting depends on the speed of melting and the size of the charge. Thus the average 7-ton furnace with a cold charge will melt in about 6 hr. using 700 kw., in 3 hr. with 1500 kw. and in 2 hr. with about 2200 kw. In the refining period the power input is dependent on the size of the charge, 500 kw. for the 4-ton, 750 kw. for the 7-ton and 1000 kw. for the 11-ton furnace.

Steel Plate Floor in Office Building

THE first important application of steel plate or "battledeck" flooring has been made by the Eastern Bridge & Structural Co. in the lobby of the Worcester Pressed Steel Co. Building, Worcester, Mass The steel plates are 3/16-in. thick, 24-in. wide and largely in 12-ft. lengths. These are welded to 3-in. standard I-beams. The welds are continuous bead type, the plates being tack-welded in place before the running of the bead. Complete cost data are being compiled by the American Institute of Steel Construction, New York.



Machining Airplane Cylinders

Steps in Transforming a Forging Into a Finished Barrel and Preparing the Cylinder Head to Go Into Assembly

BY FAY LEONE FAUROTE*

EACH of the three Wright engines, the five-, seven- and nine-cylinder, uses the same unit assembly of cylinder, cylinder head and valve mechanism. Because of the unusual form and combination of steel and aluminum used, the method by which the components forming this unit assembly are fabricated and combined is sure to prove of interest to metal workers.

The cylinder head, which is cast from aluminum alloy in the Wright foundry, is cleaned, sand blasted, heat treated to 950 deg. Fahr. for 5 hr., cooled in still air, aged for one hour at 450 deg. Fahr., again heated to 950 to 975 deg. for 1 hr., cooled and aged again for 1 hr. at 450 deg.

For its first machining, the casting is chucked on the outside diameter at the open end against the face of the flange in a Gisholt turret lathe, and the rocker boxes, exhaust and intake ports are targeted. The flange is rough and finish turned, and the boss faced, bored and drilled. The component is then transferred to a Bullard Mult-Au-Matic, where the following operations take place:

Rough and finish face open end to 3.525 ± 0.005 in. dimension.

Break sharp edges on outside dimension.

Rough bore 5⅛-in. diameter x 1 13/64 in. deep.

Rough form dome 3⅛ in. deep from face.

Finish turn dome 2 11/16-in. radius x 3.150 in. deep and bore 5 1/32 in. diameter.

Finish bore thread diameter to 5.250 ± 0.002 in. x 1.250 ± 0.002 in. deep from face.

Form 3/16 in. x 5 23/64 in. diameter, undercut square with thread diameter, holding 1.250 ± 0.002-in. depth.

Chamfer 45 deg. to 5⅜ in. diameter.

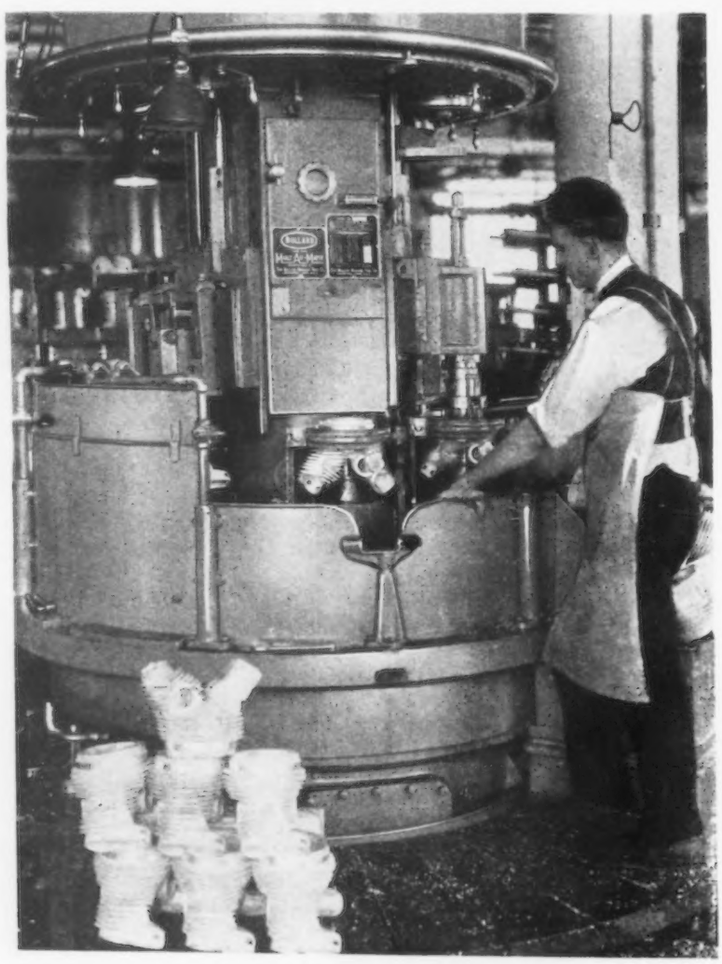
Form 1/32 x 45 deg. chamfer at outside diameter of flange.

Cut 5 11/32 in.-12P modified buttress thread.

There are six stations on the Bullard Mult-Au-Matic, one for chucking and five for machining. As a head is installed and moved to first operation, all stations are stepped up one and the finished head is removed. Thus five machining operations take place simultaneously. There are, at present, three Mult-Au-Matics at the Wright plant; one is used exclusively for machining cylinder heads and one exclusively for cylinder barrels. The other can be used for machining either the cylinder head or the barrel.

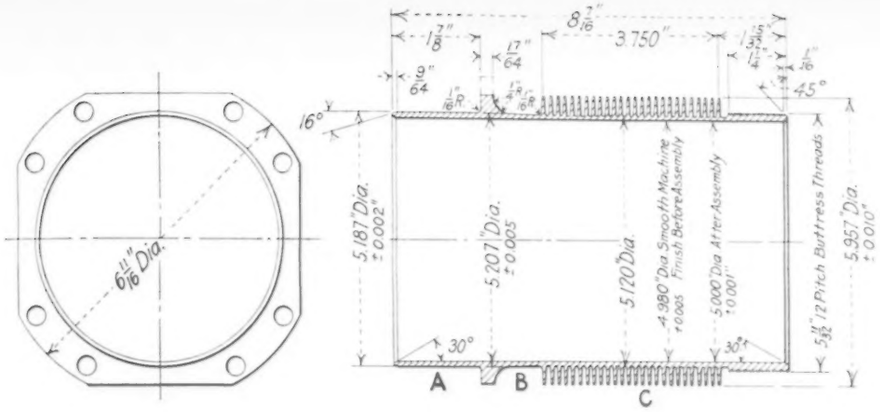
If necessary, following the above operations, the buttress thread is retapped on the drill press, after which the part is given a careful inspection, and a water test at from 500 to 600 lb. pressure. If leaks or sweating occur at the water test, sodium silicate is pumped into the cylinder at a temperature of 150 to 212 deg. Fahr. and at 500 to 600 lb. pressure. The cylinder is then washed in warm water for about a minute and baked for an hour at 500 to 600 deg. Fahr.

A 24-in. drill press is used for rough and finish boring the intake port and chamfering, after which a Leland-Gifford two-spindle special drill drills and reams the valve guide holes, spotfacing and cham-



BORING, Tapping and Finishing Dome on Cylinder Head of J-6 Series "Whirlwind" Engine on Six-Station Machine

*Mechanical engineer, New York. In THE IRON AGE of July 18, page 148, Mr. Faurote described the airplane engines of the Wright Aeronautical Corporation. In the issue of Aug. 8, page 337, he told how the connecting rods were machined and in the issue of Aug. 15, he covered the machining of the crankshaft. Remaining articles are devoted to the crankcase and to the assembly problem.

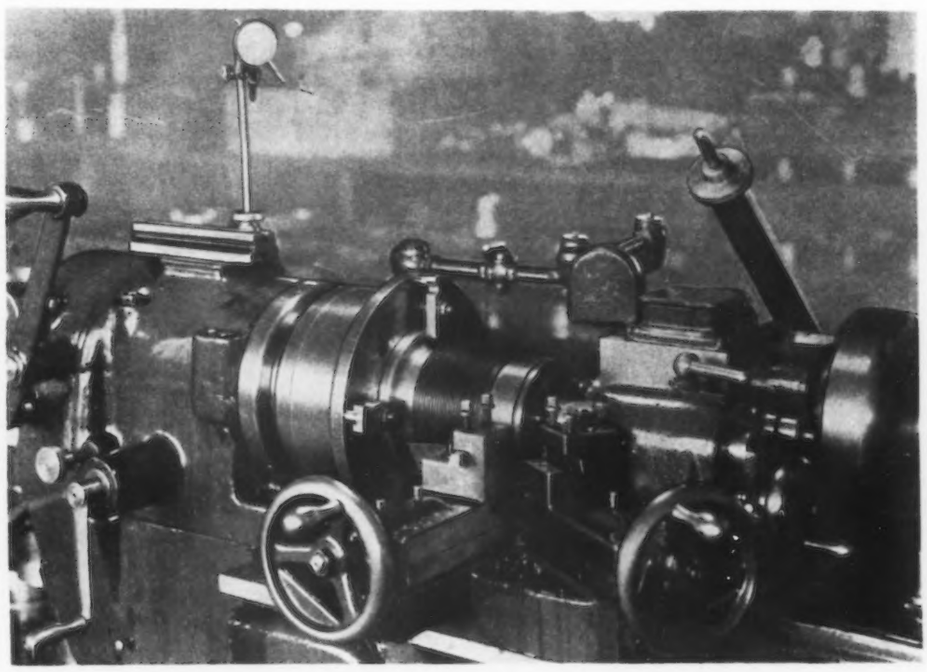


ACCURACY in Maintaining Precise Dimensions Features the Machining of Cylinder Barrels for Airplane Use, as with All Other Engine Parts. At left is the standardized "Whirlwind" Cylinder

MILLING thread on Cylinder Barrel, Facing and Chamfering Cylinder Seat in Same Operation, Thus Having Positive Square Seat with Thread (Right)

* * *

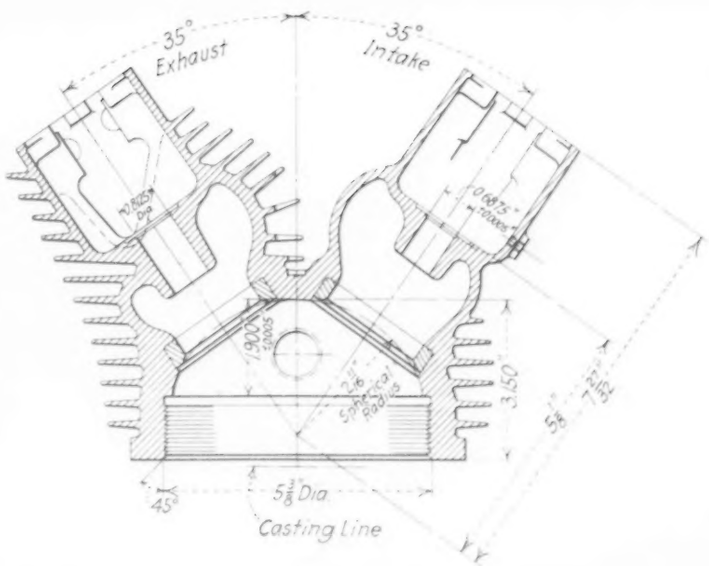
SECTION (Lower Right) Through Exhaust and Intake Ports on Cylinder Head, Indicating Extent of Cooling Ribs on Head and Exhaust



fering. The valve seats are then rough and finish bored and the bosses faced. The rocker box faces are milled on the Milwaukee special duplex miller, and the exhaust flanges are rough and finish milled on the No. 2 plain miller.

A Cincinnati horizontal miller, 18-in., then mills the rocker box bosses, and a Leland-Gifford two-spindle special drill drills and counterbores the intake and exhaust rocker boxes. A special Leland-Gifford two-spindle drill also drills and finish reams the bosses, and a single-spindle drill counterbores the rocker box boss. The rocker box faces are drilled and reamed, and the holes countersunk, and a 20-in. Barnes drill press drills a hole through the spark-plug boss, counterbores and countersinks and taps.

The No. 2 Leland-Gifford 20-in. three-spindle drill puts the "F" holes in the exhaust flange, countersinking and tapping them also. After counterboring the holes in the exhaust flange, the part is clamped in the drill jig and a hole is drilled through the boss on the



side of the intake rocker box. It is spotfaced and tapped. A bench operation removes the sharp edges in the cylinder bore and the spark-plug holes. The intake and exhaust port walls are filed and scraped, and cuts blended where necessary. After washing in hot water the cylinder head is given a complete inspection.

Machining the Cylinder Barrel

STEEL forgings for the Wright Whirlwind cylinder barrel are purchased already heat treated according to specifications. When received at the Wright plant they are inspected for dimensions, examined for defects and for external appearance relative to machining, such as scale, and tested for hardness.

The first machining operation is on the Fay automatic roughing lathe, which rough turns and forms the outside diameter. The process is as follows: First a hole is chucked in; then diameters 5 5/16 in. and 5 7/16 in. are formed (at *A* and *B* on diagram), making a flange 7/16 in. thick, forming an angle at back of flange and holding left end to a 15/16-in. dimension. Next a 5½-in. diameter is turned (at C in diagram), making 3 15/16 in. dimension over radiating fins. Then a 6 1/16-in. diameter is turned over the fins; also a 6 13/16-in. diameter over the flange. Finally the thread end is faced to 1 7/16-in. dimension.

Next the forging is taken to a Bullard Mult-Au-Matic. Here the flange outside diameter is finish turned to 6 11/16-in. diameter. A 4 15/16-in. rough bore is put through. Then the end is rough and finish faced to 1 25/32 in. from face of (unfinished) flange. The 5.187-in. diameter is rough turned to 5¼ in. Next the flange is rough faced to 1 27/32 in. from end, holding 1/16 in. radius in corner.

Then the back of flange is rough tapered and angled, making flange 11/32 in. thick. The 5.207-in. diameter is turned to 5¼ in.; ¼-in. and 1/16-in. radii are held, making width of cut 15/16 in. The 5.187-in. diameter is then finish turned to 5.205 ± 0.003 in. and the flange finish faced to 1⅞ + 0.000 — 0.010 in. from end.

Following this, the back of flange is finish tapered and angled, making flange 9/32 + 0.000 — 0.010 in. thick, and with 5.207 ± 0.005-in. diameter and 5.120 ± 0.005-in. diameter, holding ¼-in. and 1/16-in. radii and making width of cut 1 in. The bore through cylinder barrel is then finished through to 4.980 ± 0.002-in. diameter. A 30-deg. chamfer is formed to gage on inside of bore at both ends, and a 16-deg. chamfer is formed outside at left end, making 9/64 to 3/16 in.

The thread is milled and the end of cylinder is faced and chamfered all in one operation on a specially designed Hanson-Whitney thread miller. This provides for a positive square seat with relation to the thread. The threads, as usual, are cut on the barrel while it revolves; during each complete revolution of the barrel the tool traverses the width of one thread and the thread is thus made continuous.

Sharp edges at top of fins are broken slightly on a speed lathe before the cylinder barrel is given a thorough washing in gasoline. It is then inspected and delivered to finished stores or to the cylinder machining assembly.

Assembling Cylinder Barrel and Head

AT this point the cylinder barrel, which in the meantime has been machined as above (virtually in the same manner as described in the former articles on the manufacture of the Wright engine, THE IRON AGE, March 1, 1928, p. 591), is ready for assembly with the cylinder head. The cylinder is heated to 650 to 700 deg. Fahr. and held at this temperature for half an hour, after which it is removed from the furnace and set on pads of the fixture, open end up. The intake pipe connection is driven into seat, as are the exhaust valve seats and intake valve seats. The cylinder barrel is then screwed into place, the plugs and clamps removed and the assembled cylinder set on a bench to cool in an inverted position, that is, with the open end up.

After filing and scraping the intake and exhaust port walls and inspecting the assembly for cracks, the spark-plug inserts are screwed into place and the assembled cylinder given a hydraulic test at 500 to 600-lb. pressure per sq. in. Cylinders for Government use are always tested in the presence of the Government inspector.

The next operation is drilling eight 13/32-in. diameter holes through the flange on a special multiple-head Leland-Gifford drill. After riveting the intake connections to the cylinder head, a hole is drilled through the intake pipe connection, a hole drilled in the flange boss, reamed, formed and tapped. A Cincinnati duplex miller then straddle-mills the cylinder barrel flange to 2 31/32 in. from center, four sides. After removing all burrs, the job is washed in Oakite about 30 sec., then rinsed in cold water, then in hot, finally sprayed with Hilo metal primer, baked at 450 deg. Fahr. for 1½ hr., sprayed with Hilo black cylinder enamel, baked at 450 deg. Fahr. for 1½ hr. and cooled in air. All priming and enamel are of course kept off all finished surfaces on cylinder head, and also the lower flange face and cylinder barrel.

On a two-spindle sensitive drill, holes for the dowel pins are put in and the dowel pins placed. All the holes are retapped to remove the enamel, the valve guide holes rereamed, the intake and exhaust valve guides pressed into place and hand reamed, as are the rocker box holes also. A Cincinnati plain grinder with a live head squares up flange and grinds diameter to 5.187 ± 0.002 in. A back spotfacing machine spotfaces eight 13/32-in. holes in flange 11/16 in. diameter, after which the assembly is taken to a Heald automatic grinder, which rough and finish grinds the cylinder bore to 5.000 ± 0.001-in. diameter. The cylinder is finished by stoning on a Hutto lapping machine 5.000 ± 0.001 in. diameter. After washing thoroughly with gasoline and undergoing a complete inspection, the cylinder assembly is then delivered to the finished stockroom ready for the engine assembly line.

Soft Surface on Quenched High-Carbon Steel

In order to determine whether the speed of cooling was sufficient to retain austenite at the surface of quenched high carbon steel, or whether the expansion and contraction stresses would modify the theoretical condition materially, Professor Honda and his associates quenched a number of small blocks (20 x 20 x 40 mm.) of Swedish steel. Their results are given in *Science Reports*, Tohoku Imperial University, for May, 1929.

The specimens quenched were sawn lengthwise by a copper band with carborundum powder scattered over it, and one-half of them were again cut into halves. During these processes, the specimens were always cooled in water in order to avoid their tempering. Exterior and interior surfaces were then explored with microscope, with sclerescope and with X-ray diffraction apparatus.

Results, summarized in the table, show that the amount of retained austenite in the outer layer is greater than in the center, the excess increasing with carbon content and quenching temperature.

Carbon content per cent	*Quenching temperature deg. C.*	*Retained austenite X-ray Analysis external surface per cent*	*Retained austenite X-ray Analysis sectioned area per cent*	*Shore Hardness external surface*	*Shore Hardness sectioned area*
1.7	1190	36	19	60	71
1.7	1150	21	17	69	71
1.5	1100	13	8	65	70
0.9	1180	26	20	69	73
0.9	1070	22	15	72	80
0.9	900	20	15	74	65
0.9	800	12	5	72	63

Government-Built Steel Motor Boats

Fleet of Ten Built by United States Engineer Corps—Methods of Shop Fabrication Outlined



BY JOHN VAN HORNE*

THREE arc-welded steel motorboats for use as carriers and tow boats on the Mississippi River and its tributaries are being built by the Corps of Engineers, United States Army. This is the second fleet to be so constructed by the Army engineers; the first seven, launched over a year ago, have been in continuous service ever since.

These launches are constructed entirely of steel, all permanent connections being made by the electric arc-welding process. Each craft is 28 ft. long over all, 7 ft. wide and 2 ft. 4½ in. deep. The freeboard varies with the load, the draft being very little when the boat is not loaded. The boats have flat bottoms, slightly stepped close to the stern, and have a rather sharp rise at bow, making a broad, flat prow, similar to the seaplane type.

Some idea of the construction of these boats may be gained from the illustrations. One shows the partially completed steel skeleton of a hull. Each rib is made from one steel channel, 1½ x 9/16 x ¼ in., except that the frame at rear end of forward bulkhead is a 1½ x 1½ x ⅜-in. angle. The two floor stringers are 3 x 3 x ⅜-in. angles, punched and bolted in position to each frame, prior to arc welding.

Angle stringers are welded, on each side, to the channel frames. These stringers are punched, and bolted to the frames, to maintain perfect alinement until arc welded. Deck beams over the forward and after bulkheads are 1½ x 1½ x ⅜-in. angles, welded directly to top ends of frames. Clamps formed from flat plate are welded to alternate frames to carry the strip of deck on each side of the open cockpit.

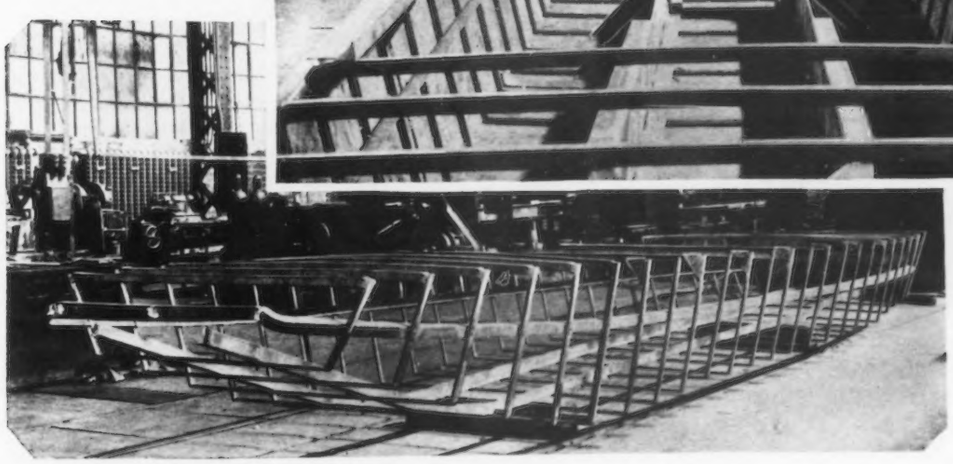
An interior view from the uncovered after bulkhead, looking forward, shows the engine base or mounting. This is constructed entirely from ¼-in. steel plate, permanently welded to the floor or bottom of the craft and to the two floor stringers. The engine base is braced on two sides by triangular pieces of steel plate with bottom edges crimped and welded to the bottom plates.

The coaming around the cockpit consists of one piece

*Field engineer, Lincoln Electric Co., Cleveland.



PARTLY Completed Steel Skeleton (Below), Viewed from the Bow. Deck beams are welded to tops of frames, floor stringers to bottom frames and side stringers to the side frames



INTERIOR Before Completion (Above). The engine mounting is braced by steel plates welded to the bottom. Riveting in forward bulkhead permits its removal

of 2 x 2 x ¼-in. angle on each side and end. As can be seen in the interior view, the rear end of forward bulkhead is fabricated by riveting, so that it may be removed, when desired.

Bottom and side plates are joined to the frames by short fillet welds about 1½ in. long and approximately 7 in. apart. The bottom is of ¼-in. plate, the sides of 3/16-in. plate and the deck of No. 10 gage sheet steel. The bumpers at the bow are for pushing barges. They are constructed of 8 in. x 1¾ in. channels, braced by triangular pieces of 3/16-in. plate, and 2 x 2 x 3/16-in. angles attached to the deck and prow.

Each boat is to be powered by a 125-hp. six-cylinder gasoline engine.

Recommended Practice For Using Lanoline Rust-Preventive

AN extended investigation into the relative suitability of several substances for preserving bright steel parts against corrosion has been described by C. Jakeman of the National Physical Laboratory, Teddington, England. (Engineering Research Special Report No. 12.)

It was found that, in general, greasy preservatives are more satisfactory than hardening pastes or varnishes, and that, of all the substances tested, lanoline, whether brushed on or deposited from a solution, forms the best coating, and has very great adhesion to steel even at high temperatures.

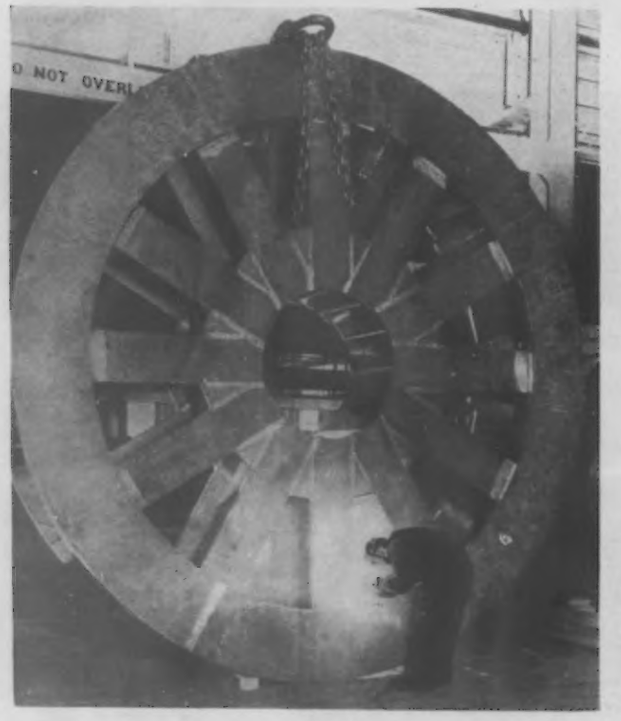
Benzine is the best solvent for naphtha, but is to be avoided upon sanitary grounds. The only other satisfactory solvents found are solvent naphtha (a mixture of toluene and xylene) or a petroleum product known in England as "white-spirit." To promote drying, i.e. to reduce the time that the lanoline has a "tacky" feel, paraffin wax up to 10 per cent or ceresin up to 3 per cent can be used. In order that one may be sure a brushed surface has been entirely covered, 0.5 per cent of oil-soluble aniline scarlet BB or oil-soluble aniline blue may be used without detriment to the preservative coating.

Lanoline may be used either as a grease or a solution. As a grease it should be well rubbed in with a rag, and will adhere more readily and in a thinner coat if it is mixed with about 10 to 15 per cent of white-spirit. As a solution it may be applied by a brush or used for dipping, the solvent being either white-spirit or solvent naphtha free from benzine. Mixtures of 50 per cent by weight with either solvent are satisfactory for use at temperatures between 40 deg. and 80 deg. Fahr., and the lanoline dissolves readily at 140 deg. Fahr.

It is usually sufficient to clean the metal with a dry cloth before either dipping it or applying the solution, but with very fine work, such as gages or safety razor blades, it may be desirable to clean the metal thoroughly with petrol before applying a white-spirit solution, or with naphtha for a naphtha solution. Bolts machined with soluble oil as a cutting fluid may fail to take a lasting coat, but machined with lard oil take it readily.

A gallon of mixture, corresponding to about 1.9 gal. of preservative, will protect about 1200 sq. ft. of surface. As between the two solutions, both of which are equally effective, that made with white-spirit dries less rapidly than the naphtha solution, but is less inflammable. The effect, however, of the inflammable vapor given off from either solution after a few hours drying is negligible.

Rails of the same heat, some having been tested without ever having been in track, and some tested after having carried 20,000,000 tons of traffic, have been studied at the Bureau of Standards. It is found that the endurance limit of the steel has not been changed either up or down by the wheel loads. Consequently it is concluded that the so-called transverse fissure, a defect of the fatigue type, must start from nucleii existing in the rails before they are laid in track. (Technologic Paper No. 363.)



Mammoth Electrical Rotor Built of Welded Steel

THE extent to which welding is being used by electrical manufacturers in the construction of large equipment is illustrated by the 16-ft. spider made by the Westinghouse Electric & Mfg. Co., East Pittsburgh, for the Aluminum Co. of America, to be installed in the plant of the Knoxville Power Co., Knoxville, Tenn. It is to be the rotor for a 45,000-kva. alternating-current generator, attached to a vertical water wheel running at 150 r.p.m. The rotor is constructed entirely of heavy steel slabs and rolled steel shapes, and the joints are made by electric arc-welding. It weighs 60,000 lb., is 16 ft. diameter and 4 ft. 4 in. wide at the rim.

Transue & Williams Office Building and, at Right, Employees' Entrance



Forging and Stamping Equipment

Modern Practice, Exemplified in Transue & Williams Plant, Shows the Large Part Taken by Mechanical Handling

IMPROVED and increased facilities for the manufacture of steel forgings and the adoption of the most modern practices in forging operations and in the handling of work in process, effecting speed and economies in operation, have been provided in the forge shop of the Transue & Williams Steel Forging Corporation, Alliance, Ohio, which has recently completed an extensive revamping and expansion program. Efficiency in the stamping plant has also been increased by various improvements.

The combined use of hammers, headers and bull-dozers for continuous operations in metal forming is provided for in the arrangement of some of the forging units. Monorails serve some of the units to expedite the movement of work, permitting the forgings to be handled through all operations without reheating. For heat treating forgings new continuous electric furnaces have been installed and other electric furnaces are provided for heat treating special steels and for case hardening by the nitrogen process. The plant is equipped as a commercial shop for making forgings for all industrial uses in sizes from 1/10 lb. to 450 lb. Its capacity is 4000 tons of forgings per month.

A continuous forging unit for making crankshafts is one of the outstanding features of the plant. Finished shafts are produced from the billet in this unit in four operations with one heating of metal. This is accomplished by the arrangement of the forging equipment to permit the speeding up of operations. Another interesting feature of the plant is the trimming press department, which is equipped with conveyors for handling forgings and scrap.

Improvement of transportation methods was one of the first matters considered in modernizing the plant. Work in process is kept off the floor by being handled in standard skids, mostly 30 by 60 in. by 24 in. deep, holding approximately 4000 lb. These are handled by a battery of lift platform electric trucks, one of which is provided with a boom and hoist for lifting dies. Truck transportation necessitated good floors. Consequently new floors were laid in the shops and the areas around the shops, considerable of which is used for storage of work in process, and the roadways connecting the buildings were paved with brick or concrete to facilitate the operation of trucks. The floors are of a 6-in. concrete base and paving brick, with a 1-in. cushion of slag between the brick and concrete. The paving laid the past few months aggregated 135,000 sq. ft.

Furnaces in the Three Main Forge Shops

THERE are three forge shops and the flow of material in these is generally in the direction of the shipping department, which adjoins the cold trimming department.

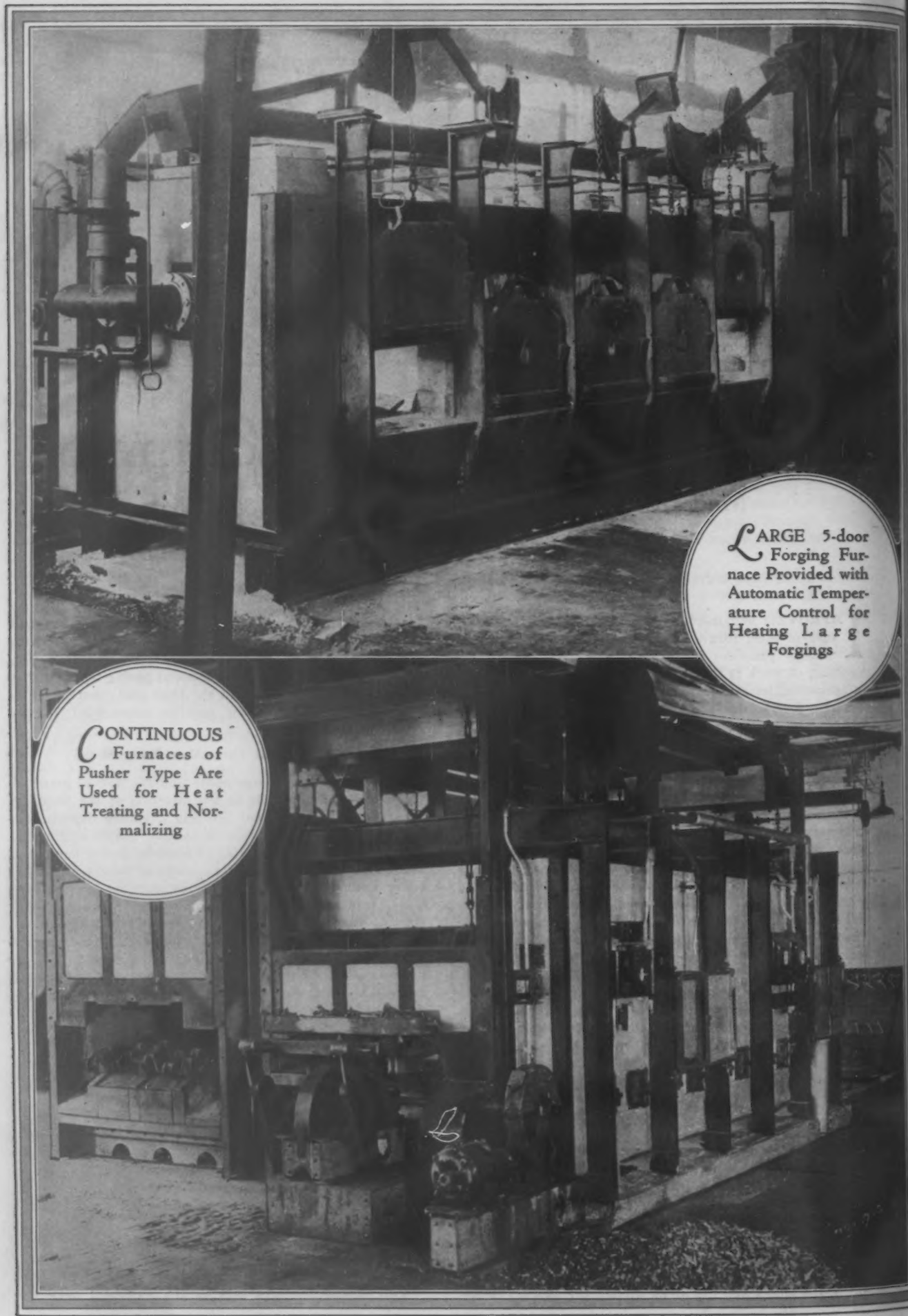
No. 1 forge shop contains mostly heavy equipment. This includes 8000, 10,000 and 16,000-lb. steam hammers. The largest hammer is used for railroad forgings and for heavy automobile and bus forgings, such as housing sections, crankshafts, front axles and other heavy parts. Heating furnaces are provided in sufficient size and number to afford ample heating service so that the proper heating and soaking temperature can be assured.

A large oil-fired forging furnace equipped with automatic temperature control was recently installed for precision heating of large axle forgings. The furnace is of the batch or "in and out" type, 14 ft. wide x 5 ft. deep. It is provided with five doors, each 2 ft. 1 in. wide by 17½ in. high. It is fired with four low-pressure burners, two being located in each wall. It is also equipped for firing with gas.

In this shop is a 5-in. and a 3-in. National forging machine. The larger machine is used for upsetting flanges on crankshafts, for forming helical worms and for other forging work, including piercing the hole through cluster and other gears. Equipment also includes a 28-in. and a 24-in. bulldozer that are used for such work as stretching axles, twisting crankshafts and forming pads.

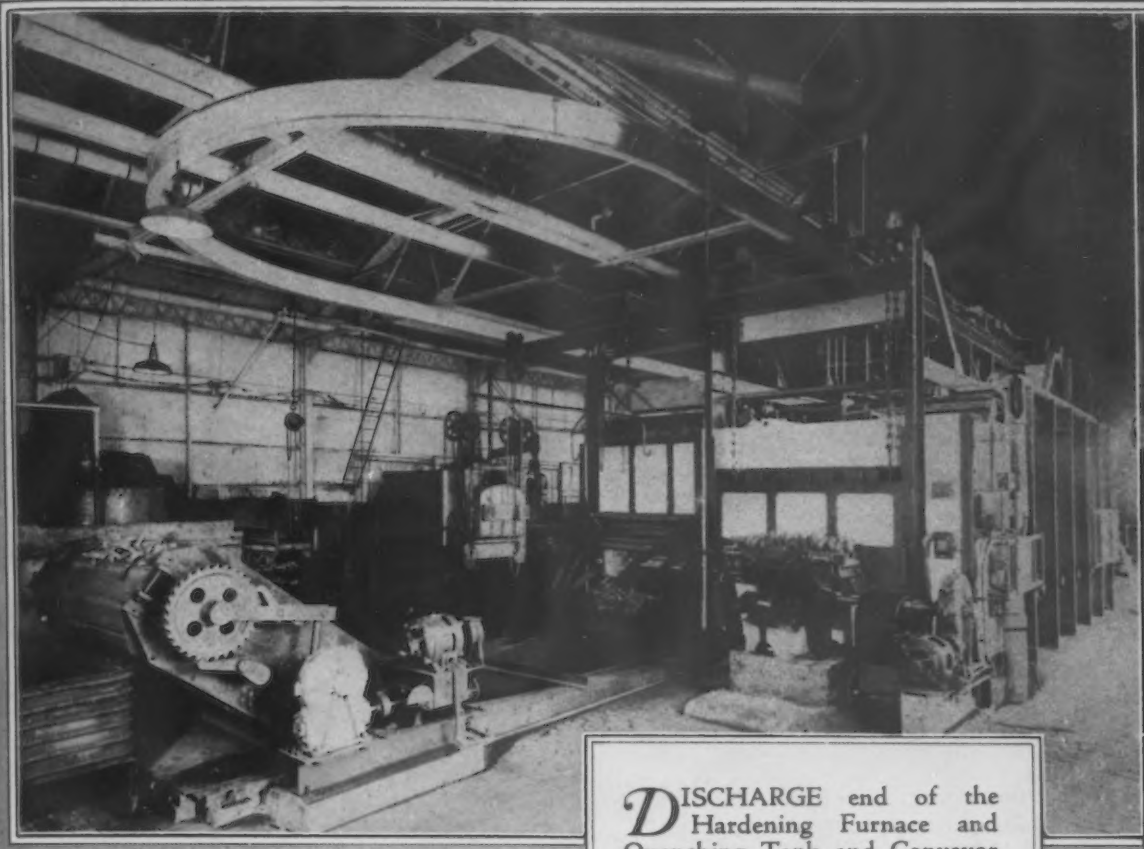
The equipment in No. 2 shop is largely board drop hammers. As most of the work in this shop is cold trimmed, not much press equipment is required.

Two of the furnaces serving the hammers have air

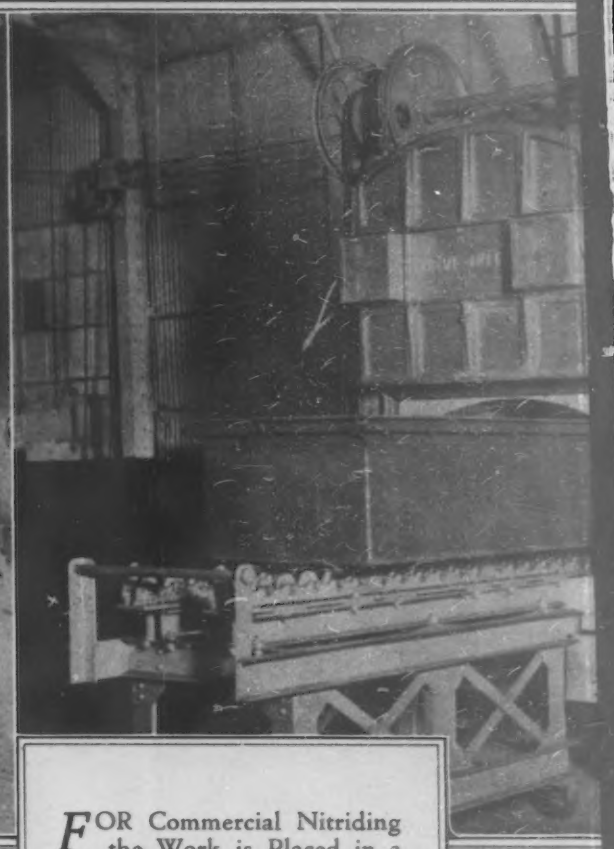


LARGE 5-door Forging Furnace Provided with Automatic Temperature Control for Heating Large Forgings

CONTINUOUS Furnaces of Pusher Type Are Used for Heat Treating and Normalizing

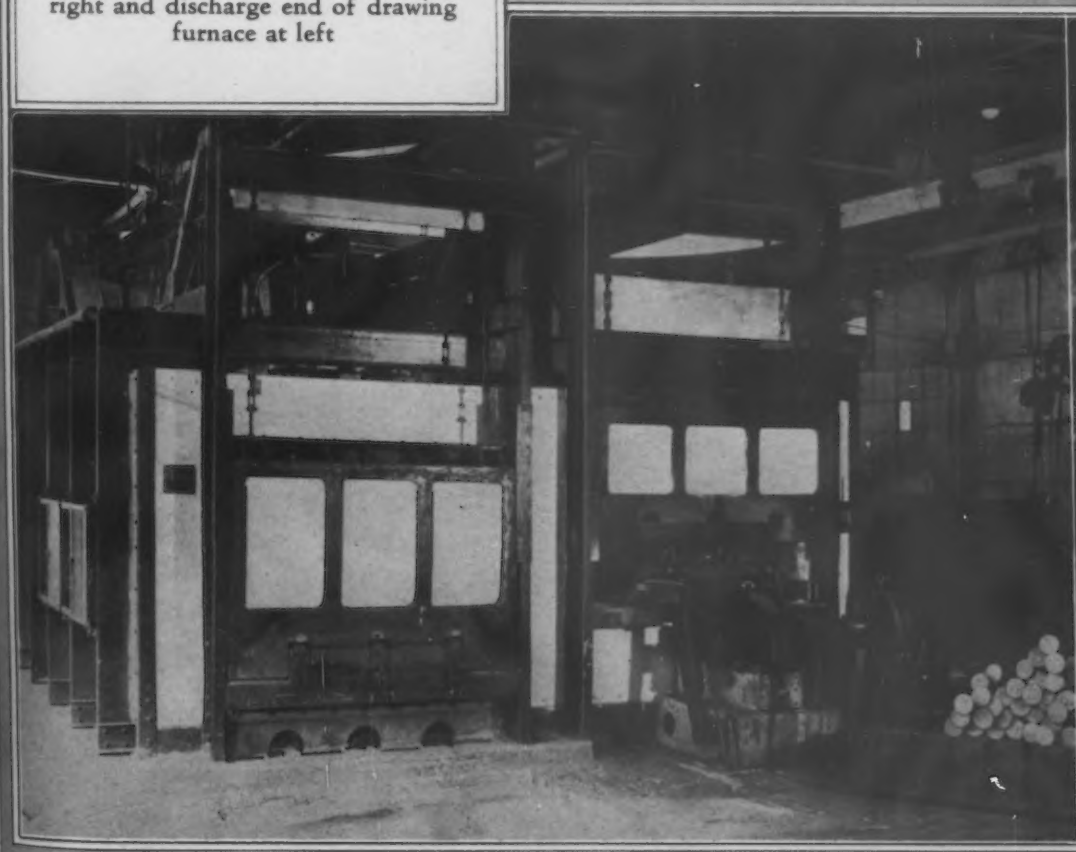


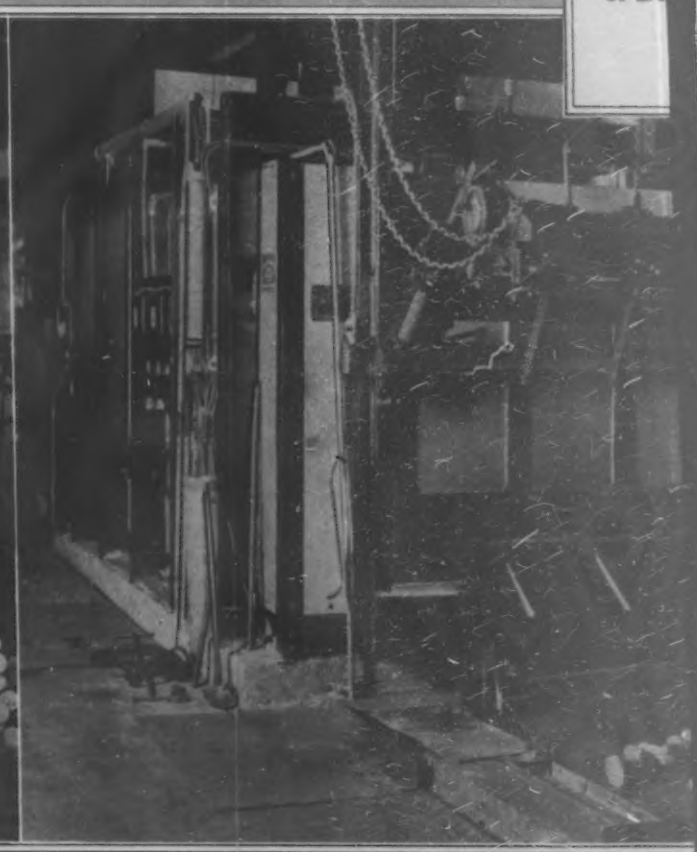
DISCHARGE end of the Hardening Furnace and Quenching Tank and Conveyor and At Right Loading End of Drawing Furnace

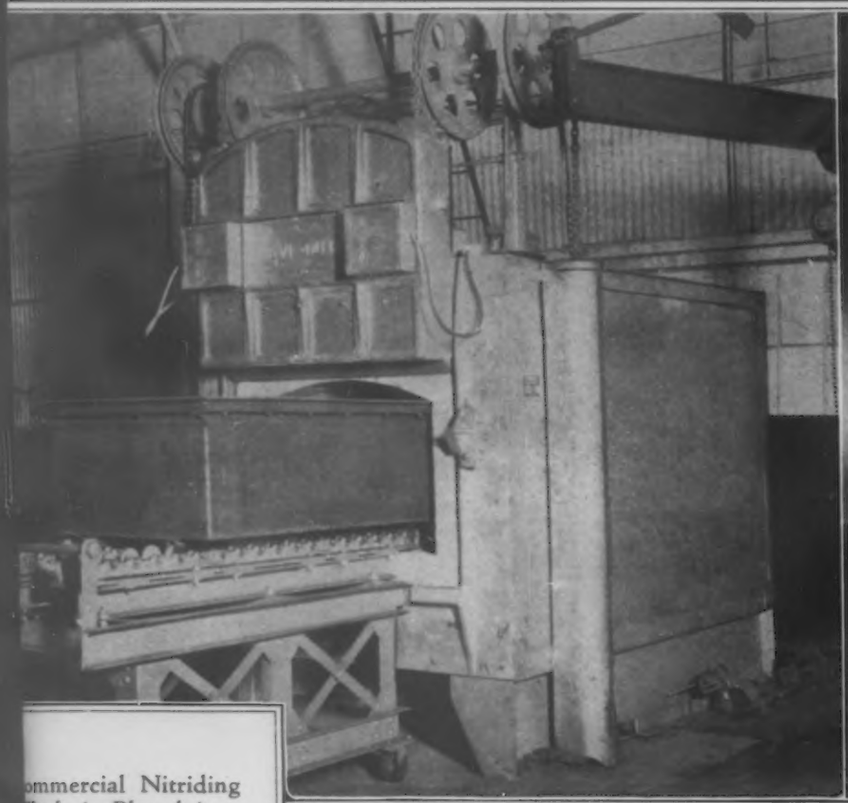


FOR Commercial Nitriding the Work is Placed in a Box of Heat Resisting Steel in an Electric Furnace

ANOTHER View of Furnaces Shown on Facing Page. Loading end of hardening furnace on right and discharge end of drawing furnace at left





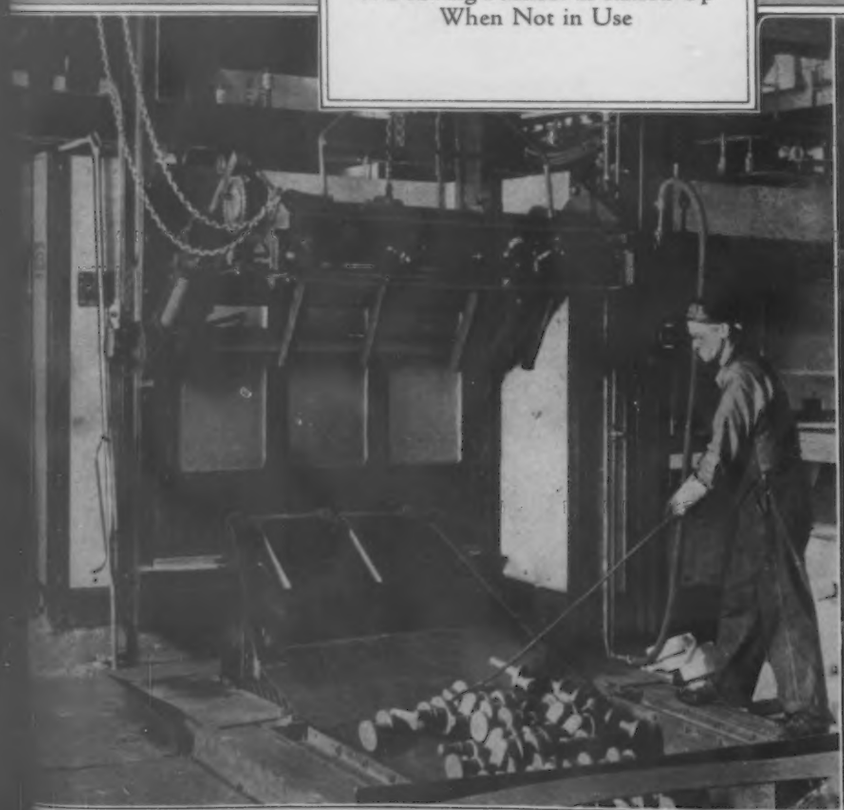


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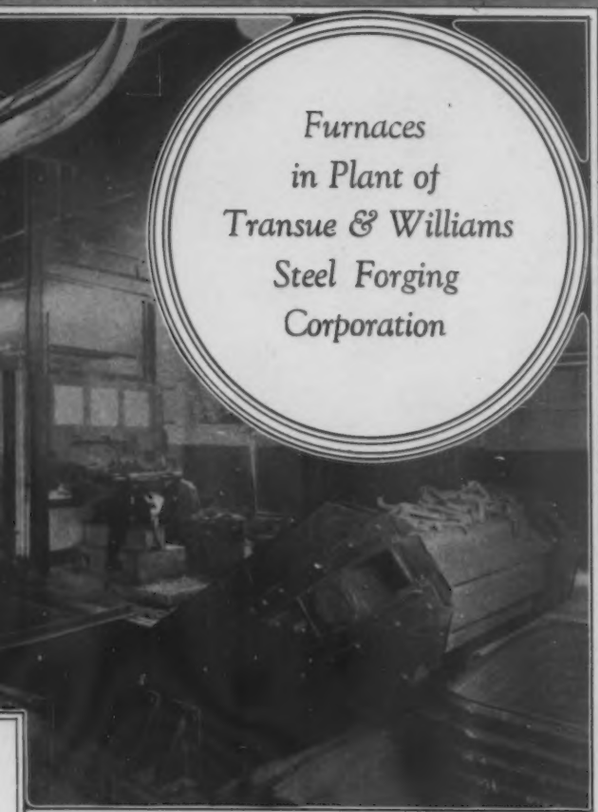


THIS is Another View of the Hardening Furnace Shown At Upper Left of This Group of Pictures

THE Tray Dumping Mechanism at the Discharge End of Drawing Furnace Is Raised Up When Not in Use

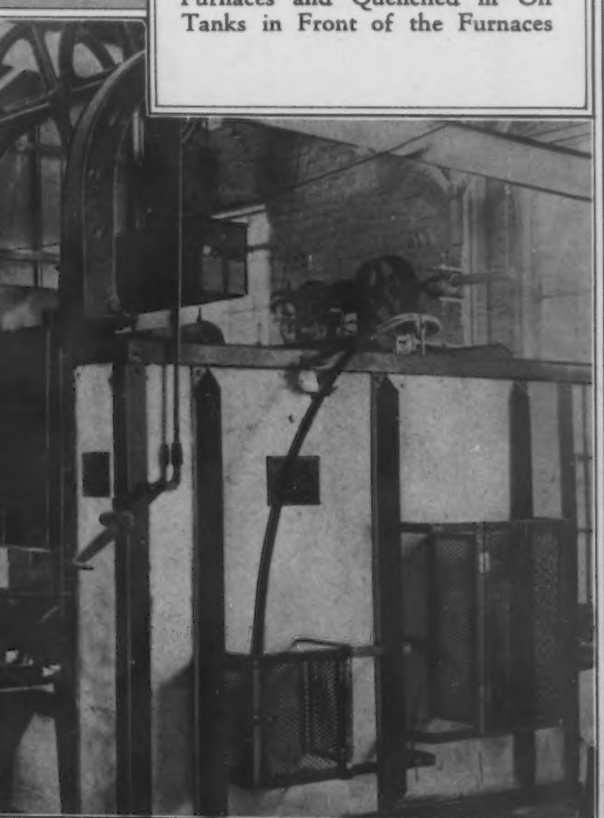






Furnaces in Plant of Transue & Williams Steel Forging Corporation

DIE Blocks are Heated for Hardening in Two Electric Furnaces and Quenched in Oil Tanks in Front of the Furnaces





recuperators. The air before going to the furnaces is heated to 750 deg. Fahr. by waste gases taken from the front of the furnace, thereby improving atomization in the furnaces. This has resulted in a more uniform and constant temperature and a reduction in fuel oil consumption.

Light and medium heavy forgings are made in the No. 3 hammer shop, which is equipped with steam hammers ranging from 1000 to 6000-lb. capacity. The furnaces for the most part are placed in a line with the hammers in this as well as in the other two shops.

The continuous unit for forging crankshafts is located in this shop. This unit includes a continuous pusher type heating furnace, a 5000-lb. hammer for blocking, a 4000-lb. hammer for restriking, a hot trimming press and a 5-in. header for upsetting the flange. The flange is upset to exact size so that no flash is left to be trimmed off. All operations are done with one heating of the metal.

The continuous heating furnace, which is oil-fired, is 4 ft. wide and 27 ft. long inside, the heating section being 21 ft. long and the soaking section 6 ft. long. The burners are located at the sides in staggered position in the heating section and set on end in the soaking section. The bars are unloaded from skids, charged into the furnace in a single row by a mechanical pusher and discharged through a side door by the hammer operator. Inspection doors are provided at intervals down the one side of the furnace. It has automatic temperature control and temperature recording instruments.

The hammers, trimming press and upsetting machine are located in line and the work is swung from one machine to the next. After upsetting the shafts go to a continuous electric furnace for normalizing and then are pickled, straightened, inspected and shipped.

An arrangement that is unusual is provided at the No. 3 forge shop. The hammers are too close together to permit electric trucks to haul material back and forth between them. Also, because of a difference in grade, the floor is about 10 ft. above the outside ground level. The handling problem that was thus caused was solved by erecting a balcony at floor level along the outer side of the building wide enough for two trucks, and providing for passageways into it on each side of the hammers through which the material is hauled. Shop No. 1 is served by an overhead traveling crane and Nos. 2 and 3 by monorails for handling dies.

Unique Combination for Hardening and Drawing

MISCELLANEOUS forgings are heat treated in two large pusher type continuous electric furnaces in a single housing separated by an insulated wall. These furnaces were built for a large output as well as flexibility of operation in order to serve the needs of the contract forging shop, which cover the various heat treatments of steel forgings, such as normalizing, hardening, drawing and annealing. The unit was also designed to handle miscellaneous sizes and shapes of forgings, ranging from pieces weighing only a few ounces to crankshafts, front axles, etc., weighing over 100 lb. each.

One furnace is used for hardening and the other for drawing and both for normalizing. The arrangement of the two furnaces and a conveyor type quenching tank comprising the unit is counterflow—that is, the hardening furnace and quench tank are arranged in a line with the material moving through this part of the equipment in a direction opposite to that taken by the material moving through the drawing furnace, so that the charging end of the hardening furnace is adjacent to the discharging end of the drawing furnace and vice versa. The electrical capacity of the drawing furnace is sufficient for its use in normalizing or annealing, with a production in proportion to the furnace length.

The hardening furnace chamber has a capacity for heating 2100 lb. of steel per hour. The heating chamber is divided into three zones, each separately and automatically controlled. The drawing furnace has a capacity of 2450 lb. of steel per hour. This chamber is 3½ ft. longer than the hardening furnace, the additional length allowing for the extra time required for drawing when running continuously as a unit with the other chamber—that is, the parts after hardening and quenching are taken continuously and at the same production rate through the drawing chamber, thus synchronizing the two operations from a production standpoint.

The furnace is heated by resistors of the cast T-grid type. These are mounted in the roof and in the floor so that the work is heated from above and below.

Both furnaces have the same method of conveying material. At the charging end of each chamber is located a motor-driven pusher intermittently operated by an electric timer, the cycle of which is variable at 15 sec. intervals through a time range varying from 1 to 6 min. Three heat resisting alloy rails extend longitudinally through the furnace, these being supported upon transverse piers extending above the furnace bottom. Material is carried through the furnace on heat resisting alloy shoes resting upon and guided by the longitudinal rails. At the discharge end of each chamber the rails terminate in slope castings. Beyond the discharge door of the hardening furnace this casting is so arranged with slots that the material is carried directly into the quenching tank and the alloy shoes are dropped through the slots, thus avoiding repeated cooling, which is destructive to heat resisting alloys.

The doors at both ends are mechanically operated by motor-driven lifting mechanisms mounted above the furnaces. These are actuated by timers and synchronized with the pusher providing the following sequence of operation:

> The doors on both ends of the chamber automatically rise.
>
> The pusher head advances, conveying the unheated material into the furnace and discharging a set of shoes loaded with forgings from the chamber at the same time.
>
> The pusher head recedes.
>
> Both charging and discharging doors lower.

Larger forgings are carried through the furnace directly on the shoes from which they slide to the quenching tank conveyor. Small forgings are carried on trays on the shoes. The trays at the discharge end are received by an automatic air-operated dumper which turns the tray over, discharging the contents into a conveyor that carries the forgings into the quench tank. The tray is retained in the brackets of the dumping mechanism. A valve operation then rotates the brackets to the original position and the tray is removed for reloading. When large forgings are being handled, the tray dumper, then not in use, is swung upward clear of the furnace discharge slope. Parts that are to be normalized are also discharged upon the quenching tank conveyor, the quenching water being partly drained off so that the conveyor belt is above the water line.

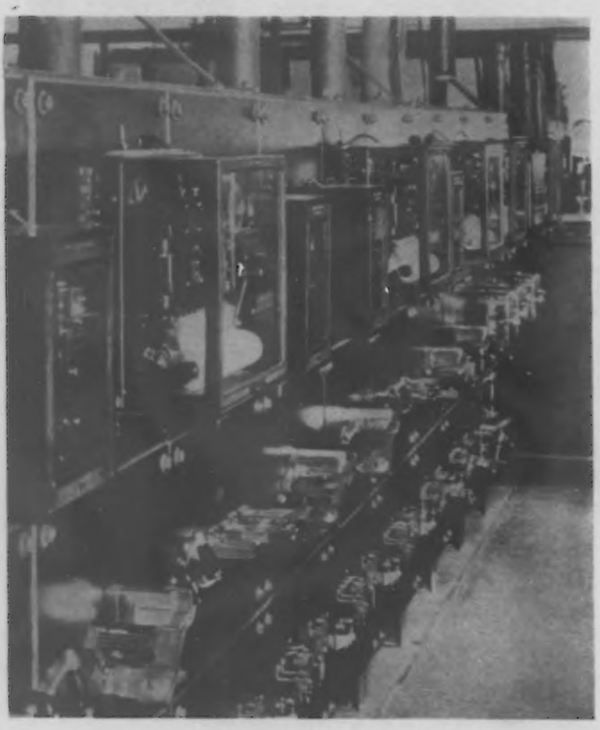
The quenching tank, of steel plate construction, is 16 ft. long, 7 ft. wide and 4 ft. deep. Its conveyor, which is motor-driven, is of the beaded flight type. Effective use of the quenching medium is secured by a recirculating water system. A double propeller in the front end of the quenching tank causes the water to pass to the back of the tank and it returns to the propeller compartment back of baffles that are located at the sides of the tank. The conveyor with its supports is an integral unit and by the unfastening of a few bolts it can be moved forward in the tank several feet to facilitate the removal of scale.

The furnaces are operated at a temperature of 1550 to 1600 deg. Fahr. for hardening and also for normalizing, and at 800 to 1150 deg. for drawing. The time of heating is from 45 min. to 2¼ hr., depending on the work.

Die blocks are heated for hardening in two 60-kw. fur-

naces. These are 27 in. wide, 15 ft. high and 5 ft. deep. They can also be used for heating miscellaneous steel forgings to be annealed. They have a capacity for heating 450 lb. of steel per hour to a temperature of 1550 deg. Fahr. Variable power input permits either large or small dies to be brought to hardening temperature on the same time temperature cycle.

The hearth consists of two parallel lines of roller rails extending the full length of the furnace and with extensions in front. The dies are placed on trays on which they are shoved through the furnace on rollers that ride on the



Control Equipment for the Electric Furnaces is Located in a Sheet Steel and Glass Enclosed Room

rails. The rollers and rails are heat treated alloy steel. The heating elements, which are of standard T-Grid cast nickel chrome alloy, are placed in the roof and below the roller rails. Cast elements also extend into the throat or vestibule at the furnace front to provide compensation for heat lost through the doors.

Handling Stainless and Other Alloys

FOR heating high-chromium stainless steels and other special alloy steels for forging, there is a specially designed, oil-fired, semi-muffled type of furnace. This is designed so that the flame will not come in contact with the steel, which is heated by radiant heat from the arch and wall. The furnace is provided with Wilson-Maeulen automatic temperature control.

The manufacture of forgings of the special Nitralloy steel has been started in an experimental way. After parts made of this steel are forged they are rough machined and then are hardened, quenched and drawn. The finished machining follows, after which they are nitrided.

An electric furnace has been installed for commercial nitriding and experimental work. The work is placed in a nitriding box fabricated of heat-resisting steel. There are heating units on the six sides of the furnace chamber. The furnace has two thermocouples, one for the chamber and the other for the nitriding box. The former is connected to an indicating controlling pyrometer and the latter to a single point pyrometer for measuring the temperature in the nitriding box. Pipes integral with the box extend through tubes in the rear wall of the furnace and are connected to other pipes leading from the tank which supplies the ammonia for nitriding. This furnace was built by the Hevi-Duty Electric Co., Milwaukee.

The control equipment for the furnaces is in a separate room that is entirely inclosed in a two-story sheet steel and glass partition housing. The control for each chamber of the large continuous heat treating unit includes three panels, each having its own control pyrometer, thermostatic relays, circuit control switch and a radial tap switch for regulating the power input. Each of these panels corresponds to one of the three control zones in each chamber. In the rear of the panel are located the magnetic contactors, which are of the oil break type. These contactors are for making and breaking the power supply to each of the separate furnace control zones for automatic temperature control.

Above the control room in a second story is located the transformer equipment, stepping down the service current, which is 2400 volts, 3-phase, 60-cycle, to the proper voltage required for each section of the furnaces. The power comes to this compartment from an overhead line to a bus arranged in back of the transformers, with primary oil switch protection. The transformers, which are of the air-cooled type, are cooled by means of air supplied to the transformer compartment by means of an individual blower which brings the air directly from the outside of the building.

The continuous heat treating furnaces, the die block hardening furnaces, the large forging furnace, the billet heating furnace and the control equipment for the electric furnaces were supplied by the Electric Furnace Co., Salem, Ohio.

[A second installment of this article will cover the handling and trimming of forgings, three methods of cleaning forgings, handling dies, storing and preparing the steel stock, and the stamping department.]

Wire Corrosion Lessened By Copper, Says German Investigator

An investigation of corrosion tests of barbed wire and wire netting, both black and galvanized and with or without the addition of copper, has been made in Germany. The results were published in *Stahl und Eisen*, by K. Daeves and briefly they were as follows:

	Period of Exposure, Months	Kind of Steel	Copper, Per Cent	Loss in Weight, Per Cent
Black wire	21½	No copper added	0.03	23.0
		Copper added	0.23	16.0
Galvanized wire	21½	No copper added	0.03	12.0
		Copper added	0.23	7.0
Galvanized wire netting	18	No copper added	0.03	28.1
		Copper added	0.15	19.3

The copper content not only retards rusting but helps to preserve the zinc coating on the galvanized wire for a considerably longer time than on the wires without copper, says the author. Further corrosion tests with material containing various percentages of copper and with different coatings are in progress.

Flotation of Manganese Ores

Experiments by the United States Bureau of Mines and the Missouri School of Mines at Rolla, Mo., show that many of the oxidized ores of manganese contain that metal in the form of the mineral known as psilomelane. This mineral will float in ordinary oil emulsions. Experimental runs on one ore recovered 80 per cent of the manganese and rejected 94 per cent of the insoluble; this result was attained with reagents and practices no different from these in commercial operation on other ores.

Truck for Oxy-Acetylene Equipment

NEW types of trucks to accommodate Carbic low-pressure acetylene generators have been introduced by the Oxweld Acetylene Co., New York. One of these, shown in the view, also carries two cylinders of



The Crane Is Used in Charging and Emptying the Acetylene Generator

oxygen chained to a steel rack. The generator is secured to the steel deck by means of angle iron braces and two long bolts inserted in the handles of the generator and tightened by means of turnbuckles.

A sturdy crane is provided to be used in charging and emptying the generator. With this crane it is an easy matter to lift the gas-bell out of the generator; the water and residue can then be drained off through the outlet at the bottom. The crane jib is made in three sections which can be telescoped when not in use to decrease the height. The truck has two 24-in. steel wheels with 3-in. tires, and a castor wheel which is 12 in. in diameter by 2 in. All wheels are provided with grease cups for lubrication.

General Utility Spray Painting Outfit

FOR touching up, refinishing, repainting, relacquering, spraying disinfectants and other general utility work, the Binks Mfg. Co., 3114 Carroll Avenue, Chicago, is offering a new Hurley all-purpose spray painting and finishing outfit.

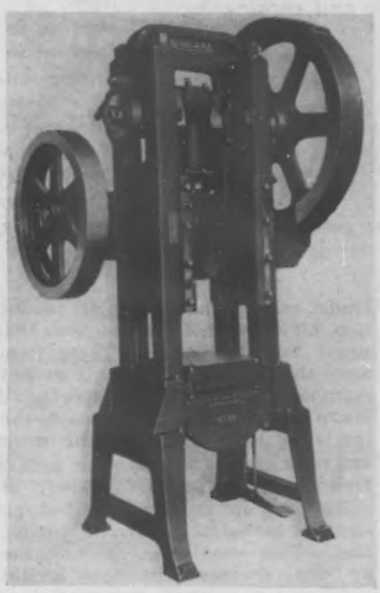
The outfit comprises a 1-qt. all-metal container, the company's new pressure cup spray gun that supplies an atomized flat spray 4 in. in width, and an air compressor, which is belt driven from a ¼-hp. General Electric motor and has a capacity of 2.16 cu. ft. of air per min. A cast-iron, ribbed air container is mounted between the motor and the compressor on a pressed metal base having rubber feet. The cylinder and base are cast in block of seasoned gray iron and are accurately machined.



The Spray Gun Supplies a 4-In. Wide Flat Spray. The 1-qt. container is made of metal

Small Press Has Frame of Tie-Rod Construction

TO meet the demand for a small press of unusual strength and rigidity, the Niagara Machine & Tool Works, Buffalo, has brought out a single-crank power press the frame of which is of four-piece steel tie-rod construction. Two sizes, designated as the No. 54 and the No. 56, are made, and can be furnished plain or single back-geared in belt or motor-driven types. The rated capacity is 32 and 56 tons, respectively. In addition to large and small blanking jobs, the machines are suitable for many of the lighter drawing operations.

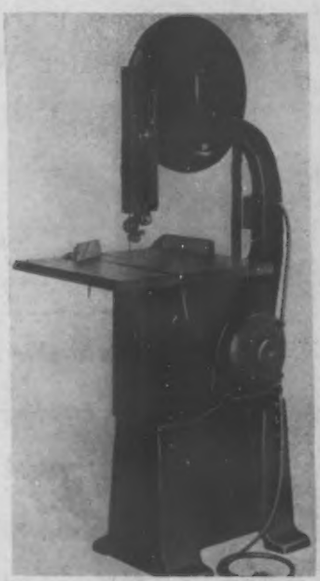


The Tie Rods, Shrunk in Place in the Frame, Add to Rigidity

The tie rods are shrunk in place in the frame. Strip stock can be fed from left to right through the openings in the uprights. The bed is at a convenient working height.

Band Saw with Direct-Connected Motor Drive

AN 18-in. portable band saw with motor-on-shaft drive and a 20 x 24-in. table that carries a miter cross-cut gage and parallel ripping fence,



The Lower Band Saw Wheel Is Mounted on the Motor Shaft. Rear view shows motor and floor base mounting

which increases the usefulness of the machine, has been added to the line of the Oliver Machinery Co., Grand Rapids, Mich. The distance from saw to column is 18 in. and the height from table to upper guide is 8 in. Saw blades from ⅛ to ½ in. wide, 9 ft. 8 in. long are used. By using gages the machine will rip material 11 in. wide and cross-cut and miter up to 8 in. The table tilts 45 deg. to the right.

The cast-iron band saw wheels are 18 in. in diameter, have a 1¼-in. rubber-covered face, and are mounted in ball bearings. The upper wheel has 4-in. vertical adjustment for tensioning the saw and a micrometer tilting device for tracking the saw on the wheel. Guides are furnished both above and below the table. The saw runs against the outer edge of a hardened wheel which revolves on a ball bearing. Hardened steel adjustable side guides or lips prevent sidewise turning of the saw.

The column of the machine and the 18-in. floor base that is optional equipment are one-piece castings. Safeguards are provided at all necessary point. The ½-hp., 900-r.p.m. ball-bearing motor employed is entirely inclosed and takes current from either lighting or power circuits. For direct current and single-phase alternating current motors a tumbler switch is furnished, while for three-phase a.c. motors a "safety first" switch is mounted on the machine. Floor space occupied by the machine, which is designated as the No. 192, is 22 x 34 in.; the weight, with motor and floor base, is 625 lb.

Industrial Recession Is About Due

Greater Weight of Unfavorable Factors Must Make Itself Felt—Supplies Exceed Demand at Current Prices

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Favorable Factors

1. *Recovery in building activity in July.*
2. *High railroad freight traffic and earnings.*
3. *Increased exports.*
4. *Employment decreased less than usual in July.*
5. *High Federal Reserve ratio; gold imports.*

Unfavorable Factors

1. *Total industrial production above normal maximum limits.*
2. *Member banks over-loaned and money tight.*
3. *Decline in unfilled steel orders.*
4. *Decline in department store sales.*
5. *Automobile production decreased more than seasonally, with sales spotty and stocks of used cars accumulating.*
6. *Machine tool orders declined.*
7. *Commodity price movement lower again.*
8. *Widespread drouth damages grain and fruit crops.*

ONE must be impressed with the fact that there are very few *new* favorable factors to report this month and that the number of developments indicating the approach of declining business activity has increased. The public will probably not realize the turn for another two or three months, but some general business recession seems about to get under way.

That the steel industry is likely to share in the anticipated recession is indicated by the fact that the ingot output has now for three months been in excess of estimated current requirements, as illustrated by the composite demand line. Incidentally, the reports of better deliveries and the ability of iron and steel producers to build up stocks, again, confirm this indication.

Recession in Steel Output Forecast

NOT in the last decade, at least, has steel production been above the demand line, while the latter has itself been declining, without a recession occurring in steel production; and the present abnormal rate of steel production but makes such a recession the more probable. Furthermore, the average daily ingot output actually did decline in July, and at a rate somewhat more than usual for the season.

The June drop in indicated requirements for steel was due chiefly to lessening building activity, railroad traffic, mining and automobile production, all of which decreased more than usual for the season. These items more than offset the gains in general manufacturing, and in exports. A sharp recovery in construction contracts in July (chiefly public works and utilities), as well as some gain in freight traffic, promised larger requirements in that month, but not enough to balance current production. This conclusion is confirmed by the decrease in the unfilled orders of the Steel Corporation in July. And the rather unfavorable June showing made by orders for sheets and steel castings, together with the large decrease in orders for railroad equipment in July, is to be noted.

As to the future, the spurt in construction contracts is probably temporary. Declines in machine tool orders, automobile production and the steel ingot output are among the reasons for expecting some decrease in general manufacturing. In view of the copper and oil situations, there seems to be no reason to expect any gain in mining activity.

Other Factors

Crop damage here and in Canada, the largest importer of our products, cannot be fully compensated for by the price advances that have occurred. Moreover, taking all these things into consideration, it is reasonable to anticipate less than the usual seasonal gain in railroad transportation, and we note that the American Railway Association estimates car-loadings for the second half at a little lower rate than for recent years. Thus, a slackening of the steel demand in the last quarter is suggested.

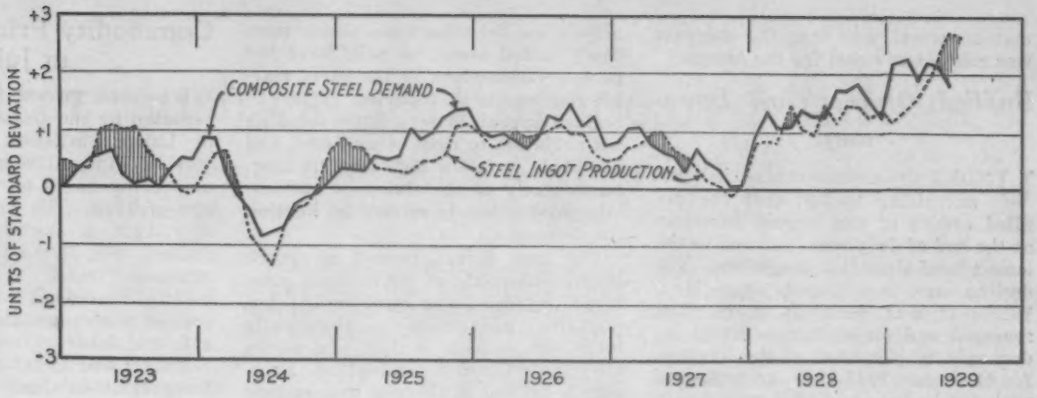
Barometer Predicts Moderate Let-Up

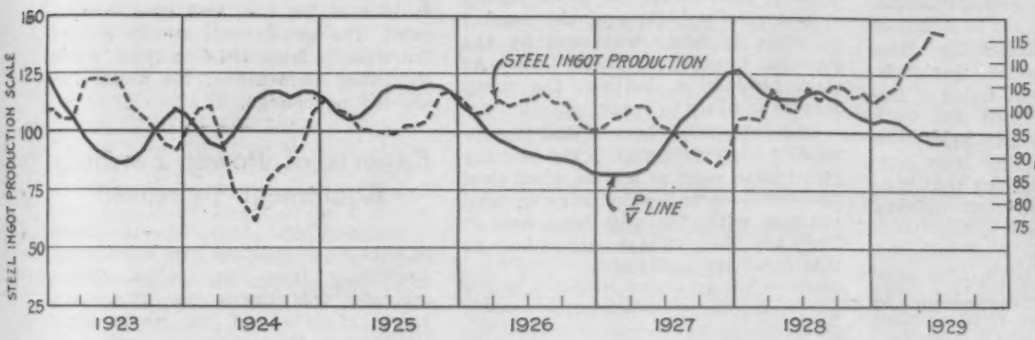
FURTHER support for the foregoing conclusion is given by the P-V line—a general business barometer based on the ratio of commodity prices to the physical volume of trade. This line has now fallen below normal, for the first time since the middle of 1927. It indicates that, *at the current price level*, the supply of commodities is in excess of the quantity demanded. It forecasts a moderate recession in business.

Being so closely linked with the general business situation, the steel industry is subject to the forecasts of this barometer. Thus we find that now, as in 1923 and 1926, the decline of the P-V line below normal has shortly preceded the peak of steel production. The July decline in ingot production is probably significant.

Allowing for the normal growth of the country's requirements, and for the usual seasonal variations, the average daily production of steel ingots decreased in July, so as to give us an "adjusted" index of 143, against 145 in June. A year ago the index stood at 119. It is significant both that the steel output is 43 per cent above esti-

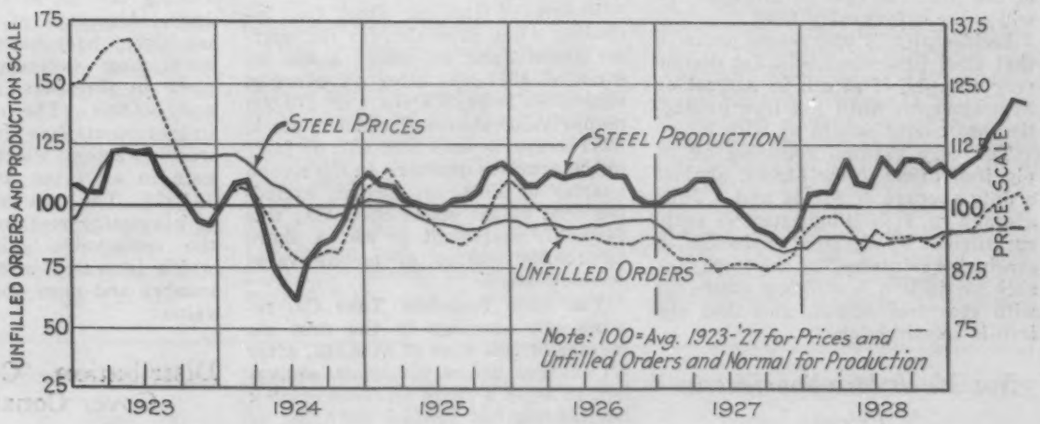
COMPOSITE Steel Demand Has Fallen Well Below the Level of Ingot Production (Adjusted). It is believed that demand will show a further moderate decline



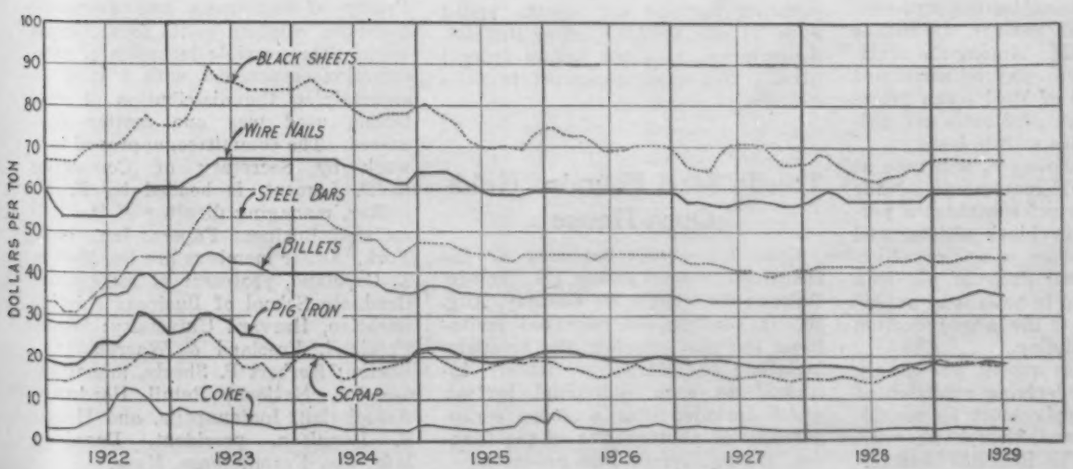


MOVEMENT of P-V Line Continues Below Normal. Steel production cannot much longer maintain its tremendous pace

STEEL Production in July, 43 Per Cent Above Normal Requirements, Was Almost Up to the 45 Per Cent Excess in June. Prices have declined slightly. Unfilled orders decreased heavily



BARS Are Likely to React to Lessened Automobile Demand and Sheet Prices Appear to Be Pegged. Pig iron cannot go much lower without a break in scrap prices and a reduced coke cost. Nails have responded to the decline in building construction



mated normal, and that the decrease was more than usual for the season.

Unfilled Orders Turn Downward

UNDER the circumstances, it is not surprising to find that the unfilled orders of the largest producer at the end of July were reduced to the lowest level since last December. The decline was the largest since May, 1928. It was decidedly more than seasonal and makes our adjusted index only 99 per cent of the average for the years 1923-1925, as compared with 106 in June and 87 a year ago.

Note that this is the first mid-year reversal of an upward trend in unfilled orders, following a prolonged rise, since 1923.

Naturally this situation has been attended by some price weakness. THE IRON AGE composite index of finished steel prices declined last week from a level which it has held since March. On June 20 (THE IRON AGE, page 1711), we pointed out that conditions then suggested that finished steel prices would hold steady until August—also that the steel industry was at or very near a peak, with some recession probable before fall. It now seems likely that finished steel prices will show continued irregularity and that they will gradually sag, on the average, until about the turn of the year, but that no large decline will occur before early 1930.

Incidentally, it also seems probable that steel production will not decline very sharply, if at all, in August or September, or until pig iron production has nearly caught up with it.

The very gradual rounding off of pig iron prices (now $18.42, against a July average of $18.44 and a June average of $18.65) indicates no early curtailment of pig iron production, a conclusion reinforced by the facts that such production is still low compared with the steel output, and that pig iron is relatively cheap.

Not Much Misalinement in Prices

THE structure of iron and steel prices is little out of normal adjustment. It resembles the structure found in similar periods, as in the latter part of 1926. Among the deviations from normal may be mentioned the higher level of steel scrap prices and the fact that wire nails and galvanized sheets are a little low.

Statisticians, however, will note at least two unusual movements. Nails have declined in price without a preceding decline in black sheets, and billets have shown some reduction without the usual drop in pig iron prices. The drop in nails is as anticipated, being due to the large reduction in residential building.

Sheet prices, as quoted, are clearly pegged. The underlying condition of demand and supply must be considerably weaker, and, though we must remember that this item has been relatively low for some time, sheets seem likely to sell lower, as nails have had to do. Concessions in the sheet market continue to be reported.

Bars appear to be a little too high with relation to most other items, and are likely to follow billets before long, particularly as the slump in automobile production is obviously hurting the demand.

Pig iron prices cannot go much lower, on account of the existing price levels for coke and steel scrap; but pig iron production is abnormally large, the demand is dull, and stocks are reported to be accumulating. Probably a decline in the pig iron market awaits only a break in scrap prices and a recession in steel production.

As to steel scrap, the price plainly is abnormally high, and the market situation is being weakened by the growing production of pig iron. As steel production declines, the scrap market is likely to break.

It is interesting to note that the unusually high prices of heavy melting scrap have come at a time when steel production is unusually large in comparison with the pig iron output. They are likely to last only as long as that condition continues.

Earnings of Steel Companies Show Large Gain

Report of Ludlum Steel Co., including Atlas Steel Co., for the quarter ended June 30, shows a net income of $311,958, after all charges, equivalent to $1.40 a share on 170,000 no-par value shares of common stock. This compares with $389,437, or $1.87 in the previous quarter. In the second quarter of 1928, net income, excluding that of the Atlas Steel Co., was $125,537, equivalent to 93c. a share on 135,000 shares of no-par value common stock.

The Ohio Seamless Tube Co. reports net earnings in the first six months of this year of $428,065, after all charges before dividends, equivalent to $4.78 a share on common stock outstanding, as against $267,238, or $2.74 a share in the same period of 1928.

The profit of the Empire Steel Corporation for the six months ended June 30 was $803,006, after interest, depreciation, etc., but before federal taxes. Net sales amounted to $15,492,278.

Toledo Steel Foundry Holds Open House

Open house was extended by the Industrial Steel Casting Co., Toledo, Ohio, to its friends, on Tuesday, Aug. 20. In sending out engraved invitations for the occasion, the company included an attractive folder, inscribed to each individual invited, which included over a dozen reproductions of photographs of the foundry, its equipment and products.

Commodity Prices Increased in July

Wholesale prices of commodities, as reported by the United States Bureau of Labor Statistics, advanced from 96.4 in June to 98 in July, both figures being based on 100 as the average of 1926. The figure was 98.3 in July, 1928, or slightly higher than at present. Six of the 10 groups showed increases, three showed decreases, mainly fractional. The largest increases were registered by farm products and foods.

Metals and metal products dropped from 105.1 in June to 105 in July, both being compared with 98.6 a year ago. The drop from June was brought about wholly by a decline from 98.2 to 97.9 of the iron and steel component. The non-ferrous metals gained fractionally from 104.8 to 105.1, while the other elements of the metal list showed no change.

Exports of Power Farming Equipment Increased

WASHINGTON, Aug. 19.—Increases in exports of tractors and harvesting machinery from the United States indicates that the movement toward power farming is progressing throughout the world, according to the Agricultural Implements Division of the Department of Commerce. During the six months ended June, 1929, shipments of power farming machinery have increased, while corresponding decreases have taken place in threshers, grain harvesters and binders. The most noteworthy improvement was in shipments of wheel tractors which showed a net gain in all types and sizes of $6,164,709. The most interesting feature of harvesting machinery exports was the remarkable gain in combines, which increased more than 2000 in number and more than $3,000,000 in value.

Distribution Census May Cover Construction

WASHINGTON, Aug. 16.—The executive committee for the Census of Distribution held a meeting here on Friday of last week and discussed questions relating to its forthcoming work. The possible inclusion of construction contractors with a view to ascertaining the distribution of materials used was one matter discussed. The committee, approved last week by Secretary of Commerce R. P. Lamont, is headed by F. M. Feiker, managing director of the Associated Business Papers, Inc., New York. Other members are Dr. Melvin T. Copeland, professor of marketing, Graduate School of Business Administration, Harvard University; W. E. Freeland, Freeland & Warren, Inc., Boston; Herbert P. Sheets, managing director, National Retail Hardware Association, Indianapolis, and Henry S. Dennison, president, Dennison Mfg. Co., Framingham, Mass.

Better Business in European Markets

Export Trade Improving—Cartel Memberships and Prices Under Review—Less Unemployment in Austria—Tin Plate Mill for Poland

(*By Cable*)

LONDON, ENGLAND, Aug. 19.

PIG iron is still quiet under the influence of the holidays, but inquiries for Cleveland foundry grades are increasing. The outlook for fall is firm, despite a steadily increasing output, especially as costs are increasing and consumers' stocks are small.

Export business has been curtailed by lack of supplies. East Coast hematite, mixed numbers, is selling at £3 15s. 6d. ($18.30) a ton, although furnaces claim that even £4 ($19.40) a ton would be unprofitable at present costs. Finished steel is quiet, with British prices firm. Some works, including Bolckow, Vaughan & Co. and the Cargo Fleet Iron Co., are still well engaged and omitted the usual holiday stop. Export business is quiet, but the Dominions are showing some interest in purchasing.

British exports in July were 35,500 tons of pig iron, of which the United States received 1600 tons. The total of iron and steel exports was 375,800 tons.

Tin plate business is improving with some good sales made for third quarter and a firm attitude on the part of makers, who have closed some good business for export to South America and Australia. Domestic demand is slightly more active. Galvanized and black sheets are quiet.

British makers have booked some good orders for railroad coaches and freight cars, including 285 for the Central Argentine Railway and 316 for the Rhodesia Railways.

Continental steel markets are stabilizing and prices are slightly firmer in some cases, but the anticipated general recovery has not yet begun. British finishing mills have taken a moderate tonnage of semi-finished material. Belgian and Luxemburg works are reported to be gradually refilling their order books, but delivery delays are still short.

French, German, Belgian and Luxemburg steel producers recently met to discuss means of arresting the decline and reestablishing prices at their former level.

German Cartel Prices Shaded —Luxemburg May Join

LONDON, ENGLAND, Aug. 5.—Control of domestic prices by the German syndicates is seriously threatened by the action of one of the large Westphalian steel merchants, who has acquired a small steel mill and begun the production of steel bars, rods and beams. While output of the mill does not exceed 50,000 tons a year, the fact that it is offering these products at 1.50 to 2.50 m. (36c. to 60c.) a metric ton less than the established syndicate prices is expected to disturb the market and a reduction of prices by the syndicates in certain districts is believed likely.

Recent developments have brought about a change in the relations of Luxemburg with Germany and Belgium. Formerly Luxemberg mills worked more closely with Belgium than with Germany, but recently they have been engaged in severe competition with Belgian mills and are beginning to cultivate closer relations with Germany. An increasing tonnage of Luxemburg steel is being sold through German sales organizations, not only in Germany but for export, and it is believed in some quarters that the Luxemburg mills will become members of the German cartels before long.

Austrian Business Good— Unemployment Declines

VIENNA, AUSTRIA, Aug. 3.—Unemployment has declined to about 100,000, the lowest point since 1924. The iron and steel industry is active largely on orders from the Government, especially for the state railroads. Wire rods, wire and sheet mills are quiet. Machinery builders are seeking increased export business.

Pig iron production in the first quarter of this year was 113,574 metric tons, steel ingot output 153,759 tons and rolling mill production 114,571 tons. The principal producer, the Austrian Alpin Montan A. G., reports a considerable increase in its output of iron ore and the company's steel mills are operating at 90 per cent to full capacity, with rolling mills at 103 per cent of rated capacity. Much of the business on the books of the Alpin Montan A. G. is for the railroads, placed under an investment plan, which provides for the renewal of permanent way material and rolling

British and Continental European Export prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.85

British Prices, f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.58	to	$17.82	Sheet bars, Thomas	4	9	to 5 0	21.58	to	24.25
East Coast Hematite	3	15	to	3	15½	18.18	to	18.30	Wire rods low C., No. 5 B.W.G.	6	4	to 6 6¼	30.06	to	30.61
Ferromanganese, export	13	10	to	14	0	65.47	to	67.90	Black sheets, No. 31 gage, Japanese	12	10	to 13 0	60.62	to	63.05
Billets, open hearth	6	7½	to	6	10	30.92	to	31.52	Rails, 60 lb. and heavier	6	10*		31.52		
Sheet bars, open hearth	6	5	to	6	10	30.31	to	31.52	Rails, light	6	1½		29.46		
Black sheets, Japanese specifications	13	0				63.05							Cents per Lb.		
Tin plate, per base box	0	18¼	to	0	18½	4.42	to	4.48	Steel bars, merchant	5	13½	to 5 14	1.24	to	1.25
Rails, 60 lb. and heavier	7	15	to	8	15	37.59	to	42.43	Steel bars, deformed	5	12	to 5 12½	1.21	to	1.22
						Cents per Lb.			Beams, Thomas, British standard	5	5	to 5 6	1.13	to	1.15
Steel bars, open hearth	7	15	to	8	10	1.67	to	1.84	Channels, Thomas, American sections	5	14	to 6 0	1.24	to	1.32
Beams, open hearth	7	2½	to	7	12½	1.55	to	1.65	Angles, Thomas, 4-in. and larger, over ⅝-in. thick	5	6	to 5 8½	1.14	to	1.17
Channels, open hearth	7	7½	to	7	17½	1.60	to	1.71	Angles, Thomas, 3-in.	5	14½		1.25		
Angles, open hearth	8	2½	to	8	12½	1.76	to	1.86	Ship plates, open-hearth inspected	7	10		1.62		
Ship plates, open hearth	7	12½	to	8	2½	1.66	to	1.76	Hoop and strip steel over 6-in. base	5	16	to 5 18	1.25	to	1.27
Black sheets, No. 24 gage	10	5	to	10	10	2.21	to	2.27	Wire, plain, No. 8 gage	7	8½		1.63		
Galvanized sheets, No. 24 gage	13	7½	to	13	10	2.89	to	2.92	Wire, galvanized, No. 8 gage	9	8½		2.03		
									Wire, barbed, 4-pt. No. 12 B.W.G.	11	18½		2.58		
									Wire nails, base	0	7¾		$1.87 per keg		
									Wire nails, assortments, 1 to 6-in. keg	10	6½		2.23		

Continental Prices f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	9s.	to	£3	13½s.	$16.73	to	$17.82
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	11				17.21		
Billets, Thomas	4	17	to	5	0	23.52	to	24.25

*Open-hearth steel, 10s. ($2.42) per ton extra.

stock through financing by Vienna banks. A program of orders for 1930 is being negotiated at present, which includes 60,000 tons of rails and other permanent way material, compared with 54,000 tons in 1929.

The company is engaged for the next three months on domestic orders and is in an independent position on export orders, which, at present prices, offer little or no profit.

German Mills to Cut Extra on Open-Hearth Steel

HAMBURG, GERMANY, Aug. 1.—It is expected that the extra for open-hearth steel for export will soon be reduced from 7s. 6d. ($1.82) per ton, to 5s. ($1.21) per ton. Until 1927 the extra was 5s. ($1.21) per ton, but it was then advanced. The reduction of the extra would be in line with efforts of German mills to increase export sales of open-hearth steel. Prior to 1927, little structural steel of open-hearth quality was sold for export, but now sales of shapes, plates and sheets average 35,000 tons a month. Most of these exports are to the United Kingdom and the British dominions, where there is a decided preference for open-hearth steel.

Tube Cartel Prices Shaded

HAMBURG, GERMANY, Aug. 3.—Although reports of disagreement among members of the International Tube Cartel are denied, evidence accumulates of lower prices on tubes than are recognized by the cartel. In the past week a contract on gas tubes for India was taken by a merchant at about 3 per cent less than the cartel quotation. Small tube contracts at concessions from the fixed prices are frequently reported. British merchants are importing tubes freely, the marketing agreement with the United Kingdom, which provides an allotment, not yet being in effect.

Poland to Make Tin Plate

HAMBURG, GERMANY, Aug. 3.—Polish mills are preparing to enter into the production of tin plate and by the end of 1930 production is expected to be sufficient to satisfy domestic requirements fully and permit some export. In the past, almost the entire Polish requirements of tin plate have been supplied by Welsh makers.

German Cast Scrap Weak

HAMBURG, GERMANY, Aug. 8.—Prices of machinery cast scrap have declined from 69 m. to 68m. ($16.42 to $16.18) per ton within the past week, while other grades are strong, with heavy melting steel firm at 66m. ($15.71) per ton, delivered to consumers' works.

Michigan Steel Corporation, Ecorse, Mich., has removed its Detroit offices to 2400 New Union Trust Building.

British Steel Exports Improving

Imports of Raw and Semi-Finished Material Offset by Exports of High Value—Short Rail Hauls a Factor

THAT the cheap labor, or cheap production advantage, of Continental countries over British steel producers has much diminished in the last year or two is suggested by E. T. Good in the *Engineer*, London. British shipbuilders, he points out, are not importing big tonnages of foreign plates today because of cheapness, as the cheapness has disappeared. In other lines it has lessened.

British exports for the first five months of this year, compared with the same period of 1928, showed an increase of 172,100 tons. Imports showed a decrease of 226,300 tons. The article continues: "But the tonnage figures do not tell the whole story. Whereas our imports average less than £9 value per ton, our exports are worth an average of more than £15 per ton. Actually, our exports in the first five months of this year have been worth £29,300,600 ($142,107,910), while our imports have been valued at only £9,882,100 ($47,928,185).

"Our biggest export line in tonnage is the galvanized steel sheet, worth about £15 ($72.75) a ton, and our second largest export tonnage is in tin plate, worth nearly £20 ($97) a ton. Though Germany, France and Belgium often beat us in export tonnage, we are always on top in value, except when we have a big mining stoppage. Twenty and more years ago we exported over 1,000,000 tons of pig iron annually—a low-priced raw material for foundries and steel works. Now we export less than half that tonnage of pig iron; but our exports of galvanized steel sheets and some other high-priced products have doubled, trebled and even quadrupled since the early years of the present century. On an iron and steel tonnage basis we are doing a much smaller share of the world's trade, but in value we continue to do at least fairly well.

"In no foreign country have they ore and coal and works all close together as we have.

"Again, no foreign country has either coal mines or iron and steel works near ports. We have. As regards imported ore we have some of our blast furnaces so situated that the ships can land the material right alongside the stacks, and we have coal pits and coke ovens practically at the back doors of our works. We have such a combination of geographical advantages—such short and cheap hauls by rail plus such shipping facilities—that a ton of British steel can be delivered in Canada for a much less, inclusive transport cost, than a ton of American steel can be delivered in that Dominion bordering on the United States.

"In Germany the average haul for raw materials to works and finished products to ports is about 150 miles. In France it is about 200 miles. In our country it is under 30 miles. Even in tiny Belgium the works are so situated that imported ore has to travel about 80 miles from the seaboard to the furnaces, and the finished steel for export has to travel the same distance to the docks, with the result that we hold a transport cost advantage over the Belgians. Over the Germans, the French and the Americans our advantage is very great."

Polish Membership in Steel Cartel Still Delayed

WARSAW, POLAND, Aug. 2.—The Polish Steel Syndicate has been renewed until Dec. 31, 1931. In its annual report the syndicate says that the inclusion of Polish mills in the International Tube Cartel has not had the expected result in preparing for Polish entry into the International Steel Cartel, for the obstacles to membership still exist. One obstacle has been removed by the German-Polish agreement on trade in iron and steel scrap, but this agreement is not effective until the pending German-Polish general commercial treaty has been negotiated.

The agreement for protection of markets adhered to by Poland, Czechoslovakia, Austria and Hungary has been extended to the end of this year and this also is a factor favorable to Poland's entry into the International Steel Cartel. Polish mills, however, are insistent upon their right of a monopoly in supplying their own domestic market, claiming that development of capacity in the past year justifies this demand. It is further pointed out that despite relatively low duties on steel, foreign competitors have sold but little tonnage to Polish consumers, except in wire rods and light gage sheets, not produced in Poland.

Wire Rod Cartel Reduces Far Eastern Prices

HAMBURG, GERMANY, Aug. 3.—Wire rod quotations to Far Eastern markets have been further reduced by the Continental Wire Rod Cartel. For Yokohama, Japan, and Hongkong, China, the new price is £7 13s. 6d. ($37.22) per ton, c.i.f., and for Shanghai, Tsingtau, China, and Osaka and Kobe, Japan, £7 15s. 6d. ($37.70) per ton, c.i.f.

Lower prices are said to have been necessary to meet American and Canadian competition, as Far Eastern agents of the cartel have frequently cabled that American and Canadian sales of wire rods are increasing. It is believed that with this reduction of about 5s. ($1.21) a ton, more wire rod business will be received by Continental mills from both Japan and China.

Makes Many Metal Tariff Reductions

Senate Committee Would Make Manganese Ore Free, Reduce the Ferroalloy, But Raise Minimum Duty on Steel

WASHINGTON, Aug. 20.—Revisions made by the 11 Republicans of the Senate Committee on Finance in the metal schedule of the House tariff bill include these changes:

Putting manganese ore on the free list and reducing the duty on ferromanganese from 1⅞c. a lb. of contained manganese to 0.65c.

Increasing the duty on pig iron from its present rate of $1.125 a ton to $1.50, and transferring sponge iron from a grouping with muck bar, bar iron and the like (taking, say, 0.3c. a lb.), to the pig iron paragraph, with a duty of $2 a ton.

Making the minimum duty on iron and steel bars and shapes and cast steel 0.3c. a lb. by eliminating a 0.2c. rate that the House bill provided to apply to steel valued at not over 1c. a lb.; thus, under the Senate committee change, the 0.3c. rate would apply for steel valued at not over 1½c. a lb., and not merely for steel in a range of prices between 1 and 1½c.

Raising the minimum chromium content in iron or steel, before the added 8 per cent ad valorem duty applies, to 0.3 per cent instead of 0.2 per cent.

The important changes are shown in the accompanying table. The subcommittee in charge of the metal schedule was headed by Senator Reed of Pennsylvania.

The proposed duty on 80 per cent ferromanganese would be $11.65 per ton, as against the prevailing duty of $33.60, a cut of $21.95 a ton.

The present duty of 1c. a lb. on the contained manganese, based on a 50 per cent ore, nets a duty of $11.20 per ton. It was left unchanged in the House Hawley bill. The vote to place it on the free list by the Senate committee was close, 6 to 5. Previously the Senate committee had voted 7 to 4 to give manganese ore a sliding scale of rates, beginning with 10 per cent ore, but rescinded its action shortly before it completed its work on the dutiable and free list.

While the duty on steel scrap was left unchanged at 75c. per ton, the Senate committee added the items "hammer scale, roll scale, and mill scale" in this class. On alloy scrap the Senate committee reduced to 3c. a lb. from 4c. a lb. the duty on the chromium content in excess of 0.3 per cent instead of 0.2 per cent.

An important change was made in the basket clause. The House bill provided a duty of 50 per cent on nonprecious metals coming under this clause, while the Senate cut the rate to 45 per cent. It is estimated that iron and steel products dutiable under this paragraph (399) are valued at about $9,000,000 annually.

The duty on steam turbines was reduced to 15 per cent from 30 per cent and on punches, shears and bar cutters it was reduced to 35 per cent from 40 per cent. These and other important changes are shown in the accompanying table.

Molders' patterns were named separately and the duty was fixed at 50 per cent as against various rates provided in the House bill. Upholstery nails, thumb tacks and chair glides were made dutiable at 40 per cent as against the House rate of 3c. a lb. Butts and hinges were specifically named by the Senate committee and the House duty of 50 per cent continued. In the House bill they would come under the basket clause. Slight changes were made in the phraseology in paragraph 352, covering twist drills and other metal-cutting tools, duties remaining at 50 and 60 per cent, the latter relating to alloy tools. The electrical paragraph (353) was changed to exclude clockwork mechanism included in electrical mechanisms. Laboratory instruments were also excluded, while electric meters were included.

Antimony metal, paragraph 376, was given a sliding scale by the Senate committee as against the House duty of 2c. a lb. Roughly the Senate scale provides a duty of 3½c. a lb. if the price is over 7c. and not over 8c., and it scales down to a duty of ½c. a lb. if the price is over 13c. a lb. A provision added describes "price" as meaning the wholesale price (averaged for a period of one week) of ordinary brands "in the New York market as shown by the last quotation (given in a recognized weekly trade journal to be designated from time to time by the Secretary of the Treasury) prior to the date of arrival of the imported antimony in the United States."

The duty on fluorspar was left unchanged at $8.40 per gross ton, while the duty of 23/40 of 1c. a lb. was continued on dead burned magnesite. The duty on crude magnesite was changed to 15/32 of 1c. from 5/16 of 1c. a lb. The duty on amorphous graphite was reduced to 5 per cent from 10 per cent.

Principal Senate Finance Changes in Metal Schedule of House Tariff Bill

Senate Committee Paragraph		Senate Committee	House Bill
301	Pig iron, per gross ton	$1.50	$1.125
301	Granular or sponge iron, per gross ton	2.00	0.3 (lb.)
302	Tungsten ore, lb. contained tungsten	45c.	50c.
1713	Manganese ore, lb. contained manganese	Free	1c.
302	Manganese alloys (includes ferromanganese), per lb. contained manganese	0.65c.	1⅞c.
302	Aluminum silicon alloys, per lb.	3½c.	5c.
302	Silicon aluminum alloys containing iron, per cent	25	5c. (lb.)
302	Ferro-chrome, chromium content, per lb.	2½c.	3½c.
302	Cerium metal, per lb.	$1	$2
302	Ferro-cerium, per lb.	$1	$2
	Per cent	25	25
312	Structural shapes, per lb.	0.3c.	0.2c.
312	Sheet piling, per lb.	0.3c.	0.2c.
316	Tungsten and molybdenum products, per cent.	60	25 (up)
353	Electrical products, per cent.	30	40
354	Pocket knives, valued not over 40c. per dozen, each	4c.	1c.
	Per cent	50	50
	Valued at more than 40c. per dozen, not more than 50c., each	7c.	5c.
	Per cent	50	50
369	All automobiles, motorcycles, light trucks, light busses, chassis and body, per cent.	10	25
372	Steam turbines, per cent	15	30
372	Punches, shears and bar cutters, per cent	35	40
376	Antimony metal.	Sliding scale per lb.	2c.
390	Nickel oxide, per lb.	Free	1c.
399	Basket clause (non-precious metals), per cent	45	50

Central Alloy's Sales of Toncan Iron Increase

During the first seven months of 1929 Central Alloy Steel Corporation sold more of its rust-resisting Toncan iron than in all of 1927 and came within 7 per cent of equaling the total volume for 1928, according to an announcement by the company. Sales to date are 62 per cent higher than for the same period last year. Total shipments of all the company's finished products in the first half of 1929 were 520,946 tons, against 476,946 tons in the first half of 1928.

Enduro-Nirosta steel, made by the Central Alloy Steel Corporation, has been specified for the kitchen equipment of the eastern Pennsylvania prison to be erected near Philadelphia. This company will also supply rust-resisting Toncan iron for all sheet and light plate metal work at the prison.

Titusville Iron Works Co., Titusville, Pa., has moved its New York sales office to 285 Madison Avenue. This company, which has manufactured steel heating and power boilers, tanks and engines for the past 65 years, has become a division of the Struthers Wells-Titusville Corporation, Titusville. The corporation consists of the Struthers Wells Co., Warren, Pa.; Titusville Forge Co. and the Titusville Iron Works Co. The sales offices of the three divisions at New York are in charge of M. A. Cordner, who has been associated with the Titusville Iron Works Co. for 25 years.

To Interpret the Chicago World's Fair

Committee of Engineers Will Plan That Exposition May Tell Story of 100 Years Advancement

IN order that engineering science may be adequately interpreted to the public and that its relation to the progress during the past century may be graphically depicted, leading engineering authorities in this country have been asked to serve on the National Research Council Science Advisory Committee to the Chicago World's Fair Centennial Celebration to be held in 1933. The engineers will strive to formulate a philosophy for the exposition of engineering knowledge which will reveal the advancement made in the United States since the beginning of the so-called industrial revolution and up to the present time.

The engineering members of the advisory committee include Dean Anson Marston, Department of Engineering, Iowa State College of Agriculture and Mechanic Arts, who will prepare data on civil engineering progress; William L. Batt, S-K-F Industries, New York; for mechanical engineering; C. F. Kettering, General Motors Research Corporation, Dayton, for automotive data; W. H. Eisenman, secretary American Society for Steel Treating, who will report on steel treating; Prof. A. H. White, Department of Chemical Engineering, University of Michigan, on chemical engineering; Prof. Arthur N. Talbot, Engineering Experiment Station, University of Illinois, on materials testing; Arthur D. Little, Cambridge, Mass., on chemistry; Prof. Colin G. Fink, Department of Chemical Engineering, Columbia University, on electro-chemistry; and Prof. C. K. Leith, University of Wisconsin, geology.

According to present plans the Chicago World's Fair will be different from any exposition heretofore held. The present plans are that the material progress made during the past one hundred years be displayed in such a way that visitors, in whatever field they may be interested, will be enabled to form not only a picture of the existing state of the art, but to form an idea of the development of that art from it genesis, so far as possible, in the fields of pure science knowledge.

The members of the executive committee of the advisory board are: Dr. Frank B. Jewett, chairman; Dr. George K. Burgess, Washington; Gano Dunn, New York; Dr. Vernon Kellogg, Washington; Prof. M. I. Pupin, New York; Dr. Max Mason, New York; and Dr. William Allen Pusey, Chicago. Maurice Holland, New York, has been appointed executive secretary and the committee has established offices at 40 West Fortieth Street, New York.

Colhed, a New Alloy Die Steel

A SPECIALLY made carbon-vanadium tool steel for cold-heading dies has recently been put on the market by the Vanadium Alloys Steel Co., Latrobe, Pa. It is manufactured in such a manner that the center of the bar is claimed to be as solid as the outside. Dies used for cold-heading work usually have the impression sunk in that part of the steel which corresponds to the center of the bar and many users of cold-heading dies have experienced considerable difficulty in sinking and chipping because of porosity of the steel, says a statement of the company.

This new steel, sold under the trade name of "Colhed," has a higher vanadium content than other carbon-vanadium steels now on the market. The thickness of the hardened case can be accurately controlled, it is claimed, by merely varying the temperature. The new steel has been under test in operating conditions for approximately two years and is now being introduced to the trade.

Dies made of "Colhed," cold formed a 15/16-in. square head on a ⅞-in. diameter bolt, have averaged, it is stated, 30 per cent better than a number of other steels. They cold formed the head on a No. 10 countersunk flathead screw, averaging 125,000 pieces per die, with runs as high as 300,000 pieces.

In cold forming alloy steel roller bearings, the new steel dies turned out 49,000 bearings per day. Some of the dies will be exhibited at the National Metal Exposition in Cleveland the week of Sept. 9.

Blast Furnace for Japan

The Asano Bussan Co. has retained the Freyn Engineering Co., Chicago, in connection with the design of a complete blast furnace plant to be located in Japan.

Japanese May Make Own Steel Piling

WASHINGTON, Aug. 17.—It is reported that the Yawata Steel Works in Japan is seriously considering the manufacture of sheet steel piling, according to a report received by the Department of Commerce from Tokio. With the great building activity which has taken place since 1923, a big market for sheet piling has developed in Japan, particularly with the introduction of improved methods of building construction. The Yawata Steel Works is understood to be seeking a share of this business and, inasmuch as all of the sheet steel piling which is imported is patented, the Yawata works is said to be endeavoring to design a purely Japanese type.

The report also says that, according to the sales department of the Yawata works, a larger proportion of wire rods should be supplied by Japanese mills, and the company proposes to increase its wire rod production next year. Imports of wire rods have been exceptionally heavy during the past two months, and the price has been declining. The present Continental quotations are about 105 yen ($49.03) while the Yawata works is quoting 100 yen ($46.70) for August delivery.

Jones & Laughlin Expands Employees' Program

The Jones & Laughlin Steel Corporation has expanded its employees' benefit program to provide a total of $60,000,000 in group life insurance. T. M. Girdler, president, has announced the placing of a contract for an increase of $35,000,000 protection for the 25,000 employees of the corporation and its subsidiaries, the increase to become effective Aug. 31. Under the new arrangement individual life insurance benefits for the majority of the employees are larger than heretofore. The increases range from $1,000 to $4,000, with benefits determined according to occupation.

Testing Society Data Misused by Advertisers

There have been instances of the misuse, by advertisers, of data published by the American Society for Testing Materials. As a result of this the executive committee of the society has adopted the following statement of policy:

> Data or statements, quoted from society reports for advertising purposes, must be properly acknowledged and must be clearly identified as such and set apart from any interpretations or comments on them that are made by the advertiser. It is preferable that such data or statements shall be quoted in full. When considered necessary to abstract portions of data or statements, such abstracting must be satisfactory to the responsible committee of the society and be sufficiently complete that it will not state or imply conclusions other than those stated in the official society reports.

If there are any who contemplate using the society's data for advertising, the staff of the organization is willing to review such advertising copy upon request.

A preliminary program of the third Empire Mining and Metallurgical Congress, to be held in South Africa, from March 24 to May 9, has been issued. The congress headquarters are at 100 Fox Street, Johannesburg, South Africa. The various mining and metallurgical societies of Great Britain, Canada, Australia, South Africa and India cooperate in these congresses, which are held every three years.

This Issue in Brief

Metalclad construction in the larger sizes of airships, contrary to common belief, does not weigh much more than a fabric-covered ship of the same size. Single metal surface of Alclad Navy dirigible performs all of functions of five layers, exclusive of framing, with a saving in construction cost.—Page 454.

* * *

Although endurance limit for steel (or stress below which fracture does not occur under repeated loading) is about 40 per cent of its ultimate strength, for some non-ferrous alloys it is as low as 12 per cent.—Page 457.

* * *

Crescent-shaped base fractures of rails originate at a longitudinal seam in the lower surface of the base, thence gradually extending upward, investigation reveals. Such a seam or lap, it is held, is made during fabrication of the rail.—Page 458.

* * *

Finished steel prices probably will gradually sag until about the turn of the year, states economist. Decline in pig iron market awaits only a break in scrap prices and a further recession in steel production.—Page 476.

* * *

Steel company increases hot-strip steel capacity and reduces operating costs by centralizing production in a group of mills equipped with electric drive. Older steam-operated mills have been kept intact for use in emergencies and in times of peak demand.—Page 459.

* * *

By using monorails to expedite the movement of work, forgings are handled through all operations without reheating, thereby reducing production costs.—Page 467.

Cost, source of supply, uniformity of quality and degree to which the composition can be controlled by specifications are factors to be considered in choosing a non-ferrous metal or alloy for use in a commercial manufacturing operation.—Page 457.

* * *

Industrial recession but of only moderate proportions, and in which the steel industry will participate, is predicted by Dr. Haney. Declines in machine tool orders, automobile production and steel ingot output are believed to presage some decrease in general manufacturing. The public may not discern the downward trend for another two or three months.—Page 474.

* * *

Continuous forging unit produces finished crankshafts with one heating of metal from the billet in four operations. Unit consists of continuous heating furnace, 5000-lb. hammer for blocking, 4000-lb. hammer for restriking, hot trimming press and 5-in. header for upsetting the flange.—Page 471.

* * *

Method of controlling ZMC-2, the Navy's new dirigible, differs radically from previous practice. Its elevators and rudders, instead of being at the rear end, are in the form of eight fins projecting from the hull about 30 ft. forward of the stern.—Page 456.

* * *

Diameter of new all-metal dirigible is only one-third of its length, whereas the length of the familiar Zeppelin-type of airships has been from 7 to 12 times its cross diameter. Short and thick ships have less air resistance.—Page 456.

Cylinder barrel for Wright whirlwind engine is rough turned and outside diameter formed on automatic roughing lathe. Flange outside diameter is finish turned and back of flange is rough tapered and angled and then finish tapered and angled on Bullard Mult-Au-Matic. Thread is milled and end of cylinder faced and chamfered on specially-designed thread miller.—Page 464.

* * *

Main frames of all-metal dirigible ZMC-2 are merely hoops built up of cellular metal girders. Ship is practically free from internal tie wires. The cross bracings in the outer surface are dispensed with, because the sheet metal sheathing is riveted securely to girders and longitudinals and is sufficiently rigid to carry the shearing stresses in the hull.—Page 453.

* * *

Season cracking, or the spontaneous failure of seemingly sound parts made of some brasses, bronzes or nickel silver, is due to a combination of high internal or applied stress and corrosion. To correct the tendency, finished brass parts may be annealed at a low temperature or sheet, rod and tube may be "sprung" or bent to equalize the manufacturing strains.—Page 457.

* * *

Five machining operations on cylinder head of Wright whirlwind engine are performed simultaneously on Bullard Mult-Au-Matic. There are six stations, one for chucking and five for machining. As a head is installed and moved to first operation, all stations are stepped up and the finished head is removed.—Page 462.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Steel Makes Its New Uses

WE are hearing constantly, in connection with the increase in steel production, that "steel is going into new uses." The common belief seems to be that it is only a matter of somebody finding the new uses, by way of new classes of wares being wanted by the public, or of steel being substituted for something else. Such a conception is inadequate, for often the larger demand is not a matter of steel as formerly made having a new outlet open up, but of steel itself being so improved as to become more widely usable. The improvements relate both to the character of the steel and to the form in which the mill is able to supply it.

There is the case of rails. Prior to 1906 more than half the rails being laid by regular railroads were under 85 lb. per yard. Last year one-fourth the standard rails produced were 120-lb. and over, and one-half were 100-lb. and over but under 120-lb. A reasonably close estimate may be made that if the same mileage of track that was laid last year in rails 100-lb. and over had been laid with 85-lb. rails instead, the quantity would have been just half a million gross tons less. Now, there was a time when the railroads were reluctant to adopt much heavier rails in fear that the texture would not be so good. The rail makers have dealt with that situation by producing these heavy rails of a quality that meets any reasonable expectation.

Hoops have been made almost from time immemorial. The steel industry devised means for rolling them wider and thinner, the material being called "strips," with a production last year of 2,161,988 gross tons, apart from production of 560,426 tons of hoops and bands. Yet in 1909 (when if there were any "strips" they were reported as bands and hoops), the combined production was 645,512 tons. It was the development in rolling that opened up the market.

Since 1909 production of sheets 13 gage and lighter has been multiplied three and a half times. That was largely a case of better sheets making their enlarged market—better in physical qualities and better in surface finish.

In 1909 only 158,978 tons of alloy steel ingots were made, less than 1 per cent of the total of ingots. Last year 3,045,225 tons of alloy steel ingots were made, or more than 6 per cent of the total. The tonnage was multiplied by 19 and the proportion increased nearly nine-fold.

There is another and important side to this matter. In various connections the steel industry, in a way, has worked against itself. By increasing tensile strength and trustworthiness it has enabled consumers to use less weight of steel to accomplish a desired result. The H or wide-flange beam section is an illustration as to the form of steel. In the long run, of course, the industry benefits by this particular kind of improvement, but the consumer benefits still more.

The proper conception, then, is that while people have been finding new uses for steel, the steel industry has been providing steel of better quality and wider variety of form, which enable it to fit into new uses.

Economic Topsy-Turviness

AS we read the accounts of current events and the expressions of current opinions on economic issues we confess to bewilderment or such a state of mind as Alice had in Wonderland.

Mathew Woll, a well-known vice-president of the American Federation of Labor, warns us that this country is jeopardizing its prosperity by exporting its surplus capital, by which apparently he means the use of our credit for creation of capital abroad. He foresees that such a creation of capital is going to result in production that will come into competition with the production from capital at home, and will, therefore, cause further unemployment here.

Labor leaders are greatly concerned about domestic unemployment. However, the Department of Commerce, the Harvard Economic Service, Colonel Ayres and other authorities tell us that we are still enjoying unprecedented prosperity, which, of course, does not harmonize with representations as to unemployment.

We suspect that the fears and tears of the labor leaders are associated with the unemployment of relatively few persons whom altered conditions have prevented from having everything their own way. The situation of the musicians, who made themselves prohibitive in the ordinary theater and now find themselves ousted by the phono-cinema, is a striking illustration of this.

Congress is trying to make a new tariff that will decrease competitive importations and in certain lines prevent them. Some Congressmen favor rates of duty that would be completely protective. We recognize our own need for an export trade and aim at the creation of a costly merchant marine which we wish to be kept occupied. But apparently many of us dream of selling without buying and at the same time expect Europe to pay its indebtedness to

annealing and pickling). Prominent display in the

open-hearth steel. In 1906 and 1907, the two peak

us. Yet no one tells us how such results are going to be achieved.

Economic obtuseness is not, however, confined to the United States. In the Hague reparations conference Philip Snowden, chancellor of the British exchequer, is averse to the payment of reparations by Germany in goods, for he conceives that such receipts will deprive British capital and labor of the opportunity to produce. It is hard to see, however, how Germany is going to be able to pay otherwise than in goods, and whether that be done directly or indirectly does not seem to matter very much.

M. Loucheur of the French Ministry has the same aversion to payment in goods, but he also expresses fear of the American menace. Thus, while our own statesmen are dreading the European peril, the European statesmen fear an American peril.

At the same time M. Loucheur held up the United States as a model of how to obtain prosperity. In imitation, in his mind, it would be necessary only for Europe to raise its wage scale and so provide its population with increased buying power. A similar idea prevails in some quarters in this country, especially in the halls of the labor unions.

An American company became interested in a great industrial enterprise in Europe and introduced real American methods, which meant increased efficiency in production, in the course of which process it raised wages in order to secure the best workers and give them sufficient calories of food, at the same time reducing the number of workers. In this illuminating instance the local labor unions promptly objected to wages being raised and workers being displaced, and the national Government inquired what was going to be done with the thousands of inferior workers who were made idle.

Mr. Snowden and M. Loucheur, Mr. Woll and some of the proponents of general tariff advances at Washington are, of course, playing for their own hands. It is human nature for every one to want to get for himself all that he can. It is also human nature to want to have a cake and eat and keep the cake. • In international economics, however, the playing of the games in this way certainly makes for bewilderment.

Color Sells Metal Partitions

COLOR is doing much to popularize the use of steel partitions in building construction. The consumption of single pickled full cold rolled sheets and of cold rolled strip steel in this field has increased notably in the last year or two. An outstanding advantage of metal partitions is that usually they are built in sections and are movable, permitting an easy rearrangement of floor space, which is often required both in commercial and industrial office buildings. Against the flexibility of steel partitions are the greater expense and much slower work in removing and replacing tile and plaster partitions, to say nothing of the litter created in tearing the latter out.

The adoption of the easily applied lacquers of nearly every hue has given a range of color choice in building partitions and removed the objections many have had to the use of steel for this purpose. The green coating once generally applied to such steel did not appeal to the artistic taste and created sales resistance to the metal partition industry. For partitions in factory buildings the cold looking but practical green coated metal is still being used, but for office partitions the vogue has turned to coatings of eye satisfying colors. Under present methods of manufacture the green enamel is applied to the metal by dipping and then is baked on. This provides protection against corrosion. Then the color coating is applied by spraying. One company is now making steel partitions in 72 colors or shades and in addition is supplying partitions in various grains. On some contracts the entire color scheme is worked out for groups of artistic offices, so that furniture, hangings and floor coverings may harmonize with what is selected for the partitions.

Ice Cream Pants for Steel Workers

EVEN the most casual visitor at the Huntington, W. Va., plant of the International Nickel Co. (where nickel and monel metal are smelted and rolled) is impressed with one marked characteristic. It is immediately evident in the parked and hedged grounds, and the lawns extending between the buildings, up to the very doors. Windows are washed and buildings brightly painted on roofs and sides. But it doesn't stop just there. Such cleanliness and orderliness rule on the inside of the buildings as well. In the roasting department, where the sulphur is driven off the copper and nickel matte, there is hardly a whiff of the sulphur smoke that all but suffocates the unsuspecting visitor in a copper smelter. And in steam hammer shop and rolling mills the heating furnaces, even though some of them are seven years old, look as if installed last month—clean, painted, doors fitting tight, no sign of sooty smoke; everything shipshape.

It takes more than a supply of clean natural gas fuel to explain this situation; it takes even more than the apparent desire to maintain the plant and equipment at 100 per cent efficiency. It is certainly related to a conviction on the part of the management and men that the plant must be scrupulously clean in order to produce a high-grade cold-rolled sheet or cold-drawn articles, all with surfaces free from slightest blemish.

"It's all very well to do such a thing in a plant whose product is worth 50 cents a pound," it might be objected, "but it would increase the expense burden unduly if the output sold for only 4 cents." As a matter of fact, such an objector could find much the same situation existing at the Nickel company's near neighbor, the Ashland plant of the American Rolling Mill Co. This, it will be recalled, is where the continuous rolling of sheets was developed. It also contains a modern open-hearth department, blooming mill, and extensive finishing departments. The parked grounds are not so extensive, but the steel making departments and heavy blooming mills are notably tidy and orderly. The reason is aptly stated in a sign posted on the safety bulletin board in the blooming mill: "You can't make good soup in a garbage can, nor can you make high-finish sheets in a dirty mill."

Such a sign might be more appropriate in the cold rolling department (almost everything made at Ashland requires one or more cold passes after the final

annealing and pickling). Prominent display in the blooming mill merely indicates that the entire staff, from scrap unloader to shipping room roustabout, must work together to keep dirt out of and away from the steel. It would be only natural for the men in the finishing mills, in the cold rolling and inspecting departments, to have this ideal more prominently in mind. They have no hope that carelessness on their part will be covered up by further operations on the same sheet. In fact, at Ashland the crew of one of the wet cold mills, under the leadership of their foreman and the approval of the management, started the style of coming to work in white shirts and duck pants. Why not? It is hot in the summertime in Kentucky, and why shouldn't they wear seasonable clothes? They work in as clean a place as a soda fountain and much cleaner than most kitchens, where white clothes are the expected uniform.

The only difficulty with such a scheme seems to be that the men might pay more attention to keeping their clothes clean than they would to keeping the mill going—especially after their wives had faced the laundry problem. Smocks or aprons doubtless would help. Experience might even show that it would pay for the employer to meet the laundry bills, as do the bakers and restaurant owners now. At any rate, the conditions in these two plants show that it is possible and even profitable to conduct heavy metallurgical operations in cleanly surroundings, when every one concerned realizes constantly that "You can't make good soup in a garbage can."

More Pig Iron in Steel

A CAREFUL estimate of basic open-hearth steel production in the first half of this year, compared with the basic pig iron production just reported, indicates that a trifle over 2 per cent more of such steel was represented by pig iron, instead of scrap, than in the year 1928, while there was a trifle less than 2 per cent more, comparing the average of 1927 and 1928.

This does not seem like much of a change, but it means about half a million tons of scrap in the half year, and that is quite an item when it comes to getting the scrap together. When about 24,250,000 tons of basic open-hearth steel ingots and castings were made in the half year, and 12,984,864 tons of basic pig iron, the total scrap used was, roughly speaking, the difference; but the major part of that scrap was works scrap which takes care of itself, rising and falling as total production of steel—including Bessemer—fluctuates.

Obviously this increased use of pig iron in steel making was not voluntary. Scrap in the three principal markets ranged $2 to $3 a ton higher in the first half of this year than in the year 1928, so that there is no difficulty in distinguishing which was cause and which was effect. The frequent comment made earlier in the year, that on account of higher scrap prices steel makers would use more pig iron, is borne out.

The statistics of pig iron production in the first half of this year, given in last week's IRON AGE, illustrate some other interesting points. There is no longer a relationship between Bessemer pig iron production and the production of Bessemer steel and acid open-hearth steel. In 1906 and 1907, the two peak years in Bessemer steel production, the production of Bessemer and acid open-hearth steel was 95 per cent of the production of Bessemer pig iron. In 1912 and 1913 the percentage dropped to 91½. An excess of pig iron is requisite on account of losses in steel making, partly compensated by the use of scrap, and for the manufacture of ingot molds. In the first half of this year production of Bessemer pig iron (excluding low phosphorus) was 4,769,864 tons, while production of Bessemer steel ingots was 3,606,000 tons, or only 76 per cent as much.

Production of foundry iron in the half year, 2,111,170 tons, represented a rate of 4,250,000 tons per annum. As early as 1903 foundry pig iron output ran that high, and there were four 5,000,000-ton years before the war. The production of gray iron castings has evidently decreased in the last 20 years, for it is reasonably certain that foundries are not using more scrap than formerly. Yet cast iron pipe, enameled sanitary ware and radiators have undoubtedly increased. The ordinary casting of 20 years and more ago, instead of growing, has been partly replaced by rolled steel and forged steel.

However, a good statistical showing is made for the malleable iron casting. Before the war there was never a million-ton year in production of malleable pig iron, though there were approaches in 1907 and 1913. Yet in just one-half of this year production was 1,274,300 tons, showing incidentally a 35 per cent increase over the first half of last year.

CORRESPONDENCE

Welded Joints in Structures Are Self-Tested

To the Editor: Those of us who have seen certain failures in arc welding put back its progress are very anxious to do everything we can to prevent the recurrence of such mistakes. There are many engineering data being formulated for the theoretical side of arc welding, but none of these figures avails if the weld is not made correctly. These short comments are along the lines of practical welding and how to inspect it, with special reference to the comforting thought that welds are self-testing.

I think the clearest view of an arc weld in a structure is that it is a casting, merging and joining rolled structural members. The casting (weld) has not been forged or rolled; it has the properties of a casting. If welded to a casting, it would be 100 per cent physically, mechanically and structurally. But welded to a forged or rolled section, it must be used under such conditions and in such a manner that the weld is not asked to stand the strains and stresses of the rolled or forged section.

We have been fortunate in solving this difficulty by making the welded section stronger than the members being joined. This is very easy to do by increasing the section 10 to 15 per cent at the joint, and as the weld is stiffer and the elastic limit is higher than for a rolled or forged section of metal of approximately the same chemical composition, all strains are transmitted to the parent metal.

Contraction occurring in an arc weld during cooling forms the long-sought-for test for welded joints; it also improves the weld by stretching it. For instance, if you

haven't made the weld correctly or of sufficient section, the contracting strains will crack the weld. Contraction of a hot joint either stretches the joint or moves the parent metal, and very seldom in structural welding are the parent members movable.

It doesn't harm either the weld section or the parent metal to be stretched; in fact, the more it is worked beyond the elastic limit, within reasonable limits, the better it is. If the ultimate strength is exceeded by the contracting stresses and the weld breaks either in itself or away from the parent metal, it gives you the inspection test that you are looking for and it shows you that it has to be re-welded. Never in all my experience have I seen a weld crack days, months, or years after it was made; it cracks when it cools, then and there, or never.

All this applies to structural steel that contains 0.25 per cent carbon and lower. It is a good rule to avoid welding higher carbon steel (that is, 0.35 carbon and over) while it is under stress. Our experience shows that high-carbon steel should not be welded if the joint carries loads that vary in intensity, unless the proper heat treatment can be subsequently done.

C. J. HOLSLAG,
Chief Engineer and Vice-President,
Electric Arc Cutting & Welding Co.

Newark, N. J.

New Method of Sales Promotion Work

Sales Executives of Members of Structural Steel Fabricators' Association to Work for New Uses

AN advisory committee on salesmanship covering the New York district has been established by the American Institute of Steel Construction, Inc. This committee is drafted from the sales executives of the fabricators of structural steel in that district. It will meet with the staff of the institute monthly to advise on the work of the national body as it regards the development of broader markets for structural steel.

The New York Advisory Committee, at its organization meeting in July, consisted of R. W. Knight, McClintic-Marshall Co., chairman; W. Spence, Hedden Iron Construction Co.; A. M. Conneen, 3rd, Hedden Iron Construction Co.; A. J. Post and L. A. Post, of Post & McCord; J. B. Cooke, Paterson Bridge Co.; J. N. Lord, Paterson Bridge Co.; John L. Hay, Jr., Hay Foundry & Iron Works; G. D. McNaughton, Levering & Garrigues, and Charles A. Gross, Shoemaker Bridge Co. This committee will deal directly with the executives of the American Institute of Steel Construction, Inc.

Among the subjects discussed at the organization meeting was the development of a market for steel framed residences, the utilization of steel in the erection of hangars, bridges and irrigation dams. Technical problems dealing with the development of a steel plate floor system, known as the "battledeck" floor, were discussed at length and numerous welded sections of such a floor were subjected to close examination and inspection.

A more scientific method of fireproofing structural steel and the broader adoption of steel in the erection of school buildings came up for analysis. The committee, in consultation with the executive staff of the institute, decided that there was a big field for cooperative effort, especially in the development of a more aggressive selling effort and sales training. The discussion resulted in some constructive recommendations. In extending the uses and the market for structural steel, the opportunities for joint action were considered such as providing a necessity for monthly consultation.

The first meeting was attended by the members of the executive staff of the American Institute of Steel Construction, Inc. They were Charles F. Abbott, executive director; F. N. Frankland, director of technical service; T. H. Hendrix, assistant to the executive director; V. G. Iden, director of public relations; J. N. Keenan, district engineer at New York; B. F. Hastings, district engineer at Philadelphia, and Donald McConaughy, representing the advertising agent, N. W. Ayer & Sons Co.

This is the first time, it is believed, that the sales representatives of constituent member firms have been drafted into the service of a national trade organization. The American Institute of Steel Construction, Inc., however, is distinctly a selling organization planned for the purpose of developing new uses and a broader market for steel in bridges, buildings and other structures. It is felt that, by drawing upon the selling staffs of its constituent members to supplement the work of the district engineers directly engaged by the institute, a much more aggressive campaign can be initiated in the spread of a better appreciation of structural steel among engineers, architects, owners and investors.

July Building Awards Were Second Largest on Record

Building contracts awarded during July in the 37 States east of the Rocky Mountains were the second largest monthly total on record amounting to $652,436,100, reports the F. W. Dodge Corporation. This was a gain of 12 per cent over the total for the same month of 1928 and of 20 per cent over that for June, 1929.

New York and northern New Jersey established a new July record with a volume of $219,884,400, representing an increase of 104 per cent over the preceding month and of 60 per cent over July, 1928. The Middle Atlantic States and Texas also reached a new high level for July, while the New England States had the second highest July on record.

Thirty-one per cent of the awards was for residential buildings, 30 per cent for public works and utilities, 14 per cent for commercial structures, 10 per cent for industrial buildings and 7 per cent for educational buildings.

Automobile Spring Plant Building at Detroit

Construction of a new plant for the manufacture of automobile springs has been started by the Detroit Steel Products Co., Detroit. The new unit will have a floor area of 125,000 sq. ft. and will cost $1,000,000. Rapid growth of the company's steel sash business is responsible for the expansion program. With the removal of the automobile spring division to the new plant, the present plant will be given over entirely to the production of steel sash.

Lake Erie Bolt & Nut Co. Buys American Bolt Co.

Lake Erie Bolt & Nut Co., Cleveland, has acquired the American Bolt Co., Birmingham, said to be the largest manufacturer of bolts and nuts in the South. The consolidation brings together two of the oldest bolt and nut companies in the country, the Lake Erie company having been established 75 years ago and the American company 82 years ago.

The American Bolt Co. was owned by Nathan L. Miller and F. H. Mohns of Birmingham. Mr. Miller, who has been president, will retire and the plant will be operated as a wholly owned subsidiary of the Lake Erie company with the present active management headed by Mr. Mohns. The name of the American Bolt Co. will be retained.

The fall meeting of the American Refractories Institute and the Refractories Division of the American Ceramic Society will be held on Sept. 24 at the Deshler-Wallick Hotel, Columbus, Ohio. Dorothy A. Texter, Oliver Building, Pittsburgh, is secretary of the American Refractories Institute.

Iron and Steel Markets

Steel Output High, Orders Decline

Heavy Production and Shipments Cutting Deeper Into Mill Backlogs—Automobile Steels Affected Most—Further Weakness in Southern Iron

A TAPERING demand for steel is yet to be reflected definitely in mill operations, which are still at a near-capacity rate in most districts.

Meanwhile shipments are cutting heavily into backlogs in some lines, and prospects for a continuance of present high output in September depend somewhat on the extent of the expected recovery in automobile buying.

Automobile steels, including body sheets, strip steel and bars, have been more affected by declining specifications than other products. Some automobile companies are rather slow in getting in production on new models, and meanwhile are taking steel in relatively small quantities and in less aggregate volume than they used last month. Indications point to heavier motor car output next month.

Other metal-working industries are on high production schedules and apparently are consuming steel in undiminished tonnage. Notable among the most active lines are building construction and the manufacture of oil tanks, fabricated pipe, farm tractors and steam shovels.

Plates are in the strongest position among finished steel products. Chicago plate mills are booked for four to ten weeks and Pittsburgh mills from six to eight weeks. At Chicago, 6500 tons of plates has been ordered for oil tanks to be built in the Southwest and 15,000 tons for similar work is pending.

In sheets, specifications are holding up fairly well, despite the decline in consumption by the automobile industry. The leading sheet producer is operating its mills at just under 100 per cent this week and has a backlog sufficient for 60 days. Tin plate demand is receding, however, partly because the bulk of the season's requirements has been covered, but also on account of lessened needs in California, where crop damage has reduced the food pack. Some strip steel mills have reached the point of being in actual need of orders.

Pipe mills are operating at about 65 per cent, which is considered a good rate in view of the large capacity and the volume of business which has gone in recent months to a fabricator of pipe electrically welded from plates. About 250,000 tons of pipe will be required for a gas line from Amarillo, Tex., to Omaha and Chicago which the Texas Co. is sponsoring. A 10,000-ton pipe line at Everett, Wash., is up for bids.

Rail mills, now at about a 75 per cent operation, will soon reach the end of their orders, with the beginning of the fall buying movement at least four to six weeks off. Mill schedules may be reduced somewhat further by Sept. 1.

Builders of railroad cars will complete their present orders within a month or so, and new car buying in prospect is not in large volume. Several roads mentioned as possible buyers have yet to issue formal inquiries. The week's orders totaled 750 cars.

Building construction continues active, the week's awards of structural steel, at 51,000 tons, having been the largest since the last week of June. Included were 8100 tons for New York subway work, 7000 tons for a bank building in Newark, N. J., and 7000 tons for a bridge at Toledo, Ohio. The pending list was augmented by 32,000 tons.

Despite the growing unevenness of demands for various forms of finished steel, ingot output in principal producing districts holds at about 95 per cent, the falling off in some lines being offset by continued large demands in others. There is promise of high ingot production during the remainder of the quarter, even assuming a further reduction in requirements of finished steel, as badly depleted stocks of raw steel will be built up.

Outstanding in the pig iron situation is the continued weakness of Southern iron, which has declined another 50c. a ton at Chicago to $12.50, Birmingham, thereby underselling Chicago iron on a delivered basis by $2 a ton. Elsewhere in the North, Alabama iron is competing strongly for business at prices ranging from $13 to $14, yet Northern iron prices have not been affected. Shipments of Birmingham district furnaces have increased in the past two weeks, largely because of sales to outside territories.

Some buying of iron for fourth quarter has been done, but generally melters are waiting. Most furnaces are sold up for this quarter, and one Buffalo interest has withdrawn from the market for deliveries earlier than October. At Cleveland, shipments have gained through releases by foundries in the automotive field.

Foundry equipment manufacturers report July the largest month for orders since last August. Bookings for the seven months of the year were 23 per cent ahead of the corresponding period of 1928 and shipments averaged 63 per cent above those of the January-July period last year.

Heavy melting steel scrap is up 25c. a ton at Chicago on sales of 15,000 tons or more and down 25c. a ton at Pittsburgh. Strength in scrap is apparent at St. Louis, Cleveland, Detroit and Birmingham.

THE IRON AGE composite prices remain at last week's levels, that for pig iron at $18.42 a ton and that for finished steel at 2.398c. a lb. Pig iron is $1.38 higher than a year ago and finished steel is $1 a net ton higher.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

	Aug. 20, 1929	Aug. 13, 1929	July 23, 1929	Aug. 21, 1928
Pig Iron, Per Gross Ton:				
No. 2 foundry, Philadelphia	$21.26	$21.26	$21.76	$20.26
No. 2, Valley furnace	18.50	18.50	18.50	16.50
No. 2 Southern, Cin'ti	17.69	17.69	17.69	19.19
No. 2, Birmingham	14.50	14.50	14.50	15.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	17.50
Basic, del'd eastern Pa.	19.75	19.75	20.25	19.00
Basic, Valley furnace	18.50	18.50	18.50	16.00
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	18.76
Malleable, Chicago*	20.00	20.00	20.00	17.50
Malleable, Valley	19.00	19.00	19.00	17.00
Gray forge, Pittsburgh	19.76	19.76	19.76	18.01
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	105.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	35.00	35.00	35.00	32.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	32.00
Slabs, Pittsburgh	35.00	35.00	35.00	32.00
Forging billets, Pittsburgh	40.00	40.00	40.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.95	1.90
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	1.85
Bars, New York	2.29	2.29	2.29	2.24
Tank plates, Pittsburgh	1.95	1.95	1.95	1.90
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.22½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.95	1.90
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.19½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.30	2.10
Hot-rolled strips, Pittsburgh	1.90	1.90	1.90	1.75
Cold-rolled strips, Pittsburgh	2.75	2.75	2.75	2.65

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

	Aug. 20, 1929	Aug. 13, 1929	July 23, 1929	Aug. 21 1928
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.65
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	3.05	2.75
Sheets, galv., No. 24, P'gh	3.50	3.50	3.60	3.40
Sheets, galv., No. 24, Chicago dist. mill	3.60	3.60	3.80	3.60
Sheets, blue, No. 13, P'gh	2.35	2.35	2.35	2.10
Sheets, blue, No. 13, Chicago dist. mill	2.45	2.45	2.45	2.20
Wire nails, Pittsburgh	2.55	2.55	2.65	2.55
Wire nails, Chicago dist. mill	2.60	2.60	2.70	2.60
Plain wire, Pittsburgh	2.40	2.40	2.50	2.40
Plain wire, Chicago dist. mill	2.45	2.45	2.55	2.45
Barbed wire, galv., Pittsburgh	3.20	3.20	3.30	3.20
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.35	3.25
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$19.00*	$19.25	$18.75	$15.50
Heavy melting steel, Phila	16.50	16.50	16.50	13.00
Heavy melting steel, Ch'go	15.25	15.00	14.75	12.75
Carwheels, Chicago	14.00	14.00	14.00	12.75
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.50	14.50
No. 1 cast, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	14.00
No. 1 RR. wrot., Phila	16.00	16.00	16.00	13.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	13.50	11.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$2.75
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	14.75
Electrolytic copper, refinery	17.75	17.75	17.75	14.50
Tin (Straits), New York	46.50	46.37½	47.25	47.87½
Zinc, East St. Louis	6.80	6.80	6.80	6.25
Zinc, New York	7.15	7.15	7.15	6.60
Lead, St. Louis	6.55	6.55	6.55	6.00
Lead, New York	6.75	6.75	6.75	6.20
Antimony (Asiatic), N. Y.	9.00	8.75	8.75	10.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Making at 95 Per Cent Rate—Backlogs and Reserve Stock Needs Promise Continued High Operation

PITTSBURGH, Aug. 20.—Recession in steel market activity is of the most gradual character and is hardly discernible in ingot production, which in this district is at least 95 per cent of capacity. The principal steel making unit of the Steel Corporation and the district's largest independent company are practically at full capacity and of the other open-hearth furnaces numbering 58, only 11 are inactive.

This high rate of steel production, however, finds its principal foundation in commitments made some time ago, as new demands in a number of lines have been slowly but steadily tapering off for the past several weeks. It will be recalled that during the second quarter producers not only were committed against full current production, but in many lines were sold ahead for from one to more than two months. This was the result of fear on the part of consumers they would not get all the steel they wanted as promptly as they wanted it.

Deliveries against these forward protections now are serving, particularly in the case of the automotive industry, to obviate the necessity of large fresh buying. Companies making only a few products or serving a limited number of consuming industries are feeling the recession more heavily than those with wider distribution and a larger line of products. The latter still have really sizable order books, notably in the heavy tonnage products.

Few makers of bars can make quicker delivery than two weeks in any of the sizes and the demands upon local makers of plates, resulting from the shortage in the Chicago district, also make reasonably early shipment on new business difficult. Backlogs in strips are diminishing under the influence of heavy shipments and moderate new buying.

Reports as to sheet business vary somewhat, but at least the leading producer has experienced some increase in tonnage releases. Tin plate business is quiet, but that is a somewhat seasonal condition, with the canning season moving toward its peak and most of the requirements already spoken for. Business in wire products is good for the time of year.

Taken as a whole, business leaves little cause for complaint. While the trend is lower, it is not sharply so, and taking steel simply as steel without regard to its finished form, producers have enough specified tonnage not to be much concerned about maintaining a relatively full rate of steel making capacity during the remainder of this quarter. There are no reserve stocks and in the interest of economical plant operation, building up such stocks will be a possibility even if demands over the remainder of the year fail to turn upward from the present volume.

Prices generally are well maintained. In spots, they would not be called firm, but at least there is no downright weakness. Primary materials offer little of interest, except that scrap prices appear slightly softer

as a result of efforts by dealers to secure orders and a lack of interest by consumers in fresh supplies.

Pig Iron.—This market is steady as to prices, but business is very slow. Melters seem to have exceeded their requirements in their purchases for second quarter and now are able to go along without supplementing deliveries on those purchases to any considerable extent. Shipments on old orders are good and with a fairly heavy melt by the iron foundries it is believed most of the iron is going into consumption instead of to the melters' piles. Carnegie Steel Co. has taken off one of its Edgar Thomson blast furnaces for repairs, but Republic Iron & Steel Co. has put on its one idle Hazelton furnace in Youngstown, leaving the number of active stacks for this and nearby districts the same as a week ago.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Semi-Finished Steel.—Requirements of non-integrated steel manufacturers of billets, slabs and sheet bars are not so heavy as they were at the opening of the present quarter, since demands for strips and tin plate are notably lighter. The result is a somewhat easier supply situation, despite the fact that ingot production also has tapered slightly and much of the steel released for one use has gone into other channels. But there is no easing in prices. Buyers are largely under contract for the entire quarter and there is enough stability in finished steel prices to obviate pressure for lower prices on semi-finished. Prices appear firm at $35, Pittsburgh or Youngstown, for base size billets, slabs and sheet bars. Wire rods are firmly held at $42, base, Pittsburgh or Cleveland, and releases on contracts are steady.

Bars, Plates and Shapes.—The market is well maintained at 1.95c., base Pittsburgh, on these products on the general run of business. Plate prices are especially firm, because mills in this and nearby districts have commitments that preclude delivery promises of earlier than six weeks. It is reported that some mills that can make more prompt shipment are able to get 1.95c., f.o.b. mill, on shipments into the Pittsburgh district, or well in excess of 2c., delivered. Bar mill obligations range from two to three weeks in some sizes to as much as four weeks in others. The market is becoming limited in standard structural shapes, as so much of the current construction work is being supplied with special shapes. There are no large backlogs in standard structural shapes, but enough business is coming in daily to keep the mills steadily engaged.

Rails and Track Supplies.—This is usually a dull period in the demand for track accessories and the present is no exception. Most of the regular 1929 standard-section rail contracts have been completed, and it will be a month or so before 1930 requirements come before producers.

Wire Products.—Makers say that they still are able to get 2.50c. base, a lb. Pittsburgh, on plain or manufacturers' wire in this district, despite reports of lower prices in other consuming territories. Nails are commonly at $2.55, base, per keg, in carload lots. It seems that the order rather than its source governs the price, although there has been no formal abandonment of the plan announced late last year which set up prices for four or five distinct classes of buyers. Business as a whole is described as being somewhat above the average for this time of the year.

Tubular Goods.—Demand is sufficient to sustain an operation of welding and seamless pipe capacity in this and nearby districts of approximately 65 per cent. This is a better showing than it appears to be, as productive capacity, notably in seamless pipe, has grown materially in the past two years and the estimate is against the increased capacity. Although much large lap-weld pipe business has been lost by local producers to the Milwaukee company, producing electrically welded pipe, a fairly large amount of such business is coming to this district and most of the seamless pipe capacity is in this and nearby districts. Demand for butt-weld pipe is much less seasonal than formerly and there is not the variation in demand there was a few years ago. The automobile makers are taking less mechanical tubing than earlier in the year, but other tubing demands still bulk large. The pipe line which will convey natural gas from the Amarillo, Tex., field to Chicago, sponsored by the Texas Co., will probably be placed before the end of the year. This line, which will run first to Omaha and then to Chicago, will require 550 miles each of 22-in. and 24-in. pipe, amounting to approximately 250,000 tons. It is expected that the plans of companies owning by-product coke ovens to widen their markets for gas will result in a good demand later for line pipe.

Sheets.—Business has shown some increase in the past week and the leading interest, has found occasion to increase its rolling mill schedules to within a point or two of 100 per cent of capacity. This company has a backlog sufficient to insure substantially full operations for 60 days. Experience of most independent producers is of a similar tenor, but in the Youngstown district there are instances of makers having pretty well completed orders and being obliged to curtail production because of light strictly new buying. It is explained that so much tonnage is reaching buyers on old commitments that there is not much reason for additional purchases. Ford Motor Co. requirements are expanding, and there is a fairly well sustained demand from other builders. Introduction of new models is spread out over a more extended period than was true in recent years and changes in models do not mean such steep dips in the demand for steel. Sheet prices are not absolutely solid, but at the same time glaring weakness is lacking.

Tin Plate.—Mill operations reflect

The Iron Age Composite Prices

Finished Steel

Aug. 20, 1929, 2.398c. a Lb.

One week ago	2.398c.
One month ago	2.412c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	April 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

Aug. 20, 1929, $18.42 a Gross Ton

One week ago	$18.42
One month ago	18.42
One year ago	17.04
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.71,	May 14;	$18.29,	March 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.92½c. to 1.95c.
F.o.b. Cleveland	1.90c. to 1.95c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.20c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.05c.
F.o.b. Pittsburgh mills, cut lengths	2.30c.
F.o.b. Birmingham, mill lengths	2.20c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c. to 1.90c.
F.o.b. Chicago Heights mill	1.95c.
Del'd Philadelphia	2.27c.

Iron

Common iron, f.o.b. Chicago	2.05c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.20c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.35c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.20c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.55 to $2.65
Galvanized nails	4.55 to 4.65
Galvanized staples	3.25 to 3.35
Polished staples	3c. to 3.10c.
Cement coated nails	$2.55 to $2.65

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.40 to $2.50
Annealed fence wire	2.55 to 2.65
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.00 to 3.10
Barbed wire, galv'd	3.20 to 3.30
Barbed wire, painted	2.95 to 3.05
Woven wire fence (per net ton to retailers)	55.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass. (wire), mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.	2.10c. to 2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.30c.
No. 10, blue annealed, del'd Phila.	2.42c. to 2.52c.
No. 10, blue annealed, B'ham	2.35c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c. to 2.35c.
No. 13, f.o.b. Chicago dist.	2.45c.
No. 13, del'd Philadelphia	2.67c.
No. 13, blue annealed, B'ham	2.50c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Chicago dist. mill	2.95c. to 3.00c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	4.10c. to 4.20c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.50c. to 3.60c.
No. 24, f.o.b. Chicago dist. mill	3.60c. to 3.70c.
No. 24, del'd Cleveland	3.59c. to 3.69c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(½% Nickel)	0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅜ in. and larger	$2.80
Spikes, ⅜ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	12
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	½	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	3
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	48
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	42
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	56
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

to some extent the fact that Pacific Coast requirements were under early estimates on account of crop damage. Much tonnage produced for California was diverted elsewhere and reduced the requirements of the other consuming points by a corresponding amount. October specifications, which should have been in by Aug. 15, are not yet flowing in freely, but on the other hand there are occasional rush orders from points which are exceeding their estimated needs. Export business in tin plate is reported to be almost nil. Mill operations range from 75 to 85 per cent, with 80 per cent the general average.

Cold-Finished Steel Bars and Shafting.—If there has been a definite change in demand, it has been in the direction of an increase. As new models of motor cars begin to sell, parts makers get larger orders and in turn release more tonnage on orders. The market appears well established at 2.30c., base Pittsburgh, on the general run of business.

Strip Steel.—Mill activity in both hot and cold-rolled strips is somewhat out of tune with current demand; there is high engagement of productive capacity, but it appears to be chiefly on orders placed some time ago on which producers now are catching up. It is not hard to understand why there should be slackening in new buying, when it is considered that shipments are large enough to take care easily of the lighter requirements of the automotive industry, which is the largest single outlet for strip steel. The decline in demand from that source is rather sharp compared with the conditions of last year, when there was almost no decline in automobile production during the summer. But, taking the average of the past five years, the dip is rather less than usual. Prices appear well established at 1.90c to 2c., base Pittsburgh, for hot-rolled and at 2.75c. to 2.85c. base, for cold-rolled strips.

Coke and Coal.—If there is a definite trend in furnace coke prices it is downward, since extra demands that were coming from the steel companies, when high production of iron was urgent, have ceased and supplies are somewhat in excess of the regular demand. It has not been necessary lately for buyers to go above $2.75 a net ton at ovens for standard Connellsville beehive furnace coke, and for loaded cars on which consignment has been lacking even less has been done. Foundry coke is quotable all the way from $3.15 to $4.75, but on reputable brands of standard 72-hr. fuel, the market is not under $3.75, and on special brands the top quotation is readily obtained. Aside from the seasonal increase in the demand for coal for household use, the coal market is as dull as ever and prices show no tendency to get any firmer.

Old Material.—The market is dull and its tone indefinite. While good heavy melting steel is scarce, as is evidenced by recent purchases by two steel makers at $20 for strictly No. 1 railroad steel, another melter was able to buy a fair-sized tonnage of regular No. 1 grade at $18.50. The market on the steel works grades is probably as high as it will be for the present, because steel makers appear to be covered against their present order books and, while one of them is seeking supplies, the more common condition is that limitations are in force as to the amount of scrap that will be taken in. Some dealers, needing orders, are actively soliciting business in the heavy melting grade at $19. Recognizing recent sales, No. 1 heavy melting steel is quotable from $18.50 to $19.50. Price changes otherwise are unimportant. It is difficult to secure recent prices for machine shop turnings because the demand is now chiefly from dealers who sold.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.50 to $19.50
No. 2 heavy melting steel	16.50 to 17.00
Scrap rails	18.00 to 18.50
Compressed sheet steel	18.50 to 18.75
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	20.00 to 20.50
Heavy breakable cast	13.00 to 13.50
No. 2 railroad wrought	19.00 to 19.50
Hvy. steel axle turnings	16.50 to 17.00
Machine shop turnings	11.75 to 12.25
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	22.00 to 22.50
Railr. coil and leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
Low phos. billet and bloom ends	23.00 to 23.50
Low phos., mill plates	23.00 to 23.50
Low phos., light grades	20.50 to 21.50
Low phos., sheet bar crops	20.50 to 21.50
Heavy steel axle turnings	16.50 to 17.00
Electric Furnace Grades:	
Low phos., punchings	20.00 to 21.00
Hvy. steel axle turnings	16.50 to 17.00
Blast Furnace Grades:	
Short shoveling steel turnings	13.50 to 14.00
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
Cupola Grades:	
No. 1 cast	15.00 to 16.00
Rails 3 ft. and under	20.00 to 21.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Light plates, blue ann'l'd (No. 10), 1 to 10 plates	3.45c.
Blue annealed sheets (No. 13), 1 to 10 sheets	3.60c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft, ann'l'd, base per 100 lb.	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	2.90 to 3.00
Cement coated nails, per keg	3.05

Konel, New Heat-Resisting Metal, Put on Market

Development of a new metal known as "Konel," which is said to be much stronger than other metals at high temperatures and which can be used extensively in the moving parts of internal combustion engines and other extremely hot places, has been announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh.

Originally developed at the company's research laboratories as a substitute for platinum in the manufacture of filaments for radio tubes, the new metal was discovered to be harder to forge than steel and to be very tough at high temperatures when most metals lose their strength.

As a substitute for platinum it is stated that Konel metal is already saving approximately $250,000 monthly in the manufacture of radio tubes.

Luria Office in Detroit

Luria Brothers & Co., Inc., Reading, Pa., has opened a district office in suite 2037 and 2038 Book Building, Detroit, in charge of C. H. R. MacKenzie, formerly associated with Joseph Schonthal Co., Columbus, Ohio. W. R. Richey will be Mr. MacKenzie's assistant. The Luria firm also has district offices at Pittsburgh, Philadelphia, Lebanon, New York and Boston, and has five scrap yards, located at Pittsburgh, Reading, Lebanon, Coatesville and Donaghmore, Pa. The company has been engaged in the scrap iron and steel business since 1889.

China Steel

Various types of substitute materials have appeared from time to time that gave the general surface appearance of clay wall tiling. They have included enameled paper, wall board and composition tile. Those that have survived have found a substantial market resulting from the present demand for attractive, elaborately fitted lavatories and bathrooms, according to *Industrial Bulletin* of Arthur D. Little, Inc.

Now comes a new material, "china-steel," with a porcelain enamel coating on die-formed metal tiles, specially designed for nailing into place. The surface coat of the new tile is very similar to that of the more expensive clay, and the joints may be pointed up in much the same way. It is lighter, thinner, and is warranted not to crack. Perhaps the greatest potential advantage is the freedom from dependence on skilled tile setters.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10 in., Pittsburgh	$35.00
Rerolling, 4-in. and under 10 in., Youngstown	35.00
Rerolling, 4-in. and under 10 in., Cleveland	35.00
Rerolling, 4-in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	$40.00 to 41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	11.00c.
Iron ore, basis Swedish, average 65% iron	10.00c. to 11.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$16.25 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.75
Foundry, f.o.b. Connellsville prompt	$3.75 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$23.00	10%	$27.00 to $28.00
7%	24.00	11%	29.00 to 30.00
8%	25.00	12%	31.00 to 32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to $18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh	75, 20, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, P'gh	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Little Change in Steel Operations Likely for Several Weeks —Alabama Iron Makers Aggressive

CHICAGO, Aug. 20.—Pressure on local steel mills is relaxing, but in view of their heavy commitments producers are unlikely to show much change in their open-hearth operations for several weeks to come. A leading interest still finds specifications equal to shipments, but other mills are slowly reducing their backlogs. An important independent whose finishing mill operations have declined continues to produce steel ingots at capacity in order to restore depleted reserves of semi-finished material.

With deliveries slowly improving, specifying is at shorter range and production prospects for September have become more uncertain. While ingot output in the district is still at close to capacity, a decline to a rate of 85 or 80 per cent within the next 30 days is regarded as a possibility.

Railroad car builders, who form an important consuming group in this district, will complete their present production programs within a month or two. While almost every important Western carrier has been mentioned as a probable buyer of equipment this fall, few inquiries are actually out for figures. On the other hand, the vacation season, now at its height, has undoubtedly had an adverse effect on steel orders, with the likelihood that for this reason alone a recovery in demand will manifest itself next month.

An improvement in specifications from the automotive industry is also looked for. While releases from that source now are at a low ebb, increased operations among automotive foundries and better orders from a Western body builder point to heavier motor car production soon. Local mills, as well as producers elsewhere, may be adversely affected as a result of the reported intention of the Ford Motor Co. to supply all of its requirements in carbon and alloy bars from its own mills, beginning with September.

Structural steel lettings are heavier this week, and a larger amount of fabricating work is in prospect. A further decline in Alabama foundry iron to $12.50, Birmingham, has accentuated the competitive situation in the local pig iron market. Although Northern melters are no longer accustomed to using high phosphorus iron, the delivered price on the Southern product in Chicago is fully $2 a ton below that on local pig iron, and the margin is even greater at other points in this territory.

Pig Iron.—Southern foundry iron is now available in relatively small tonnages at $12.50, base Birmingham, a decline of 50c. a ton from the commonly quoted market of a week ago. The delivered price in Chicago is $18.50 a ton, or fully $2 a ton under the delivered quotation on Northern brands. Chicago district producers are still holding to $20, base, furnace, having made no move to meet the price competition from Alabama makers. It is generally recognized that foundry practice in this territory has got away from the use of iron containing high phosphorus and low manganese and that melters are reluctant to change their methods. Moreover local blast furnace interests are still in a strong position, having almost no stocks and being fortified with good backlogs. There is no question, however, that low prices on Alabama iron have caused many buyers to postpone forward purchasing, pending further price developments. Total sales of Southern iron in this territory in the past two months probably did not exceed 25,000 tons, but more and more trial orders are being placed. In the St. Louis district, sales of the Southern product are estimated at 50,000 tons. Foundry melt in Chicago and tributary areas is well sustained. There has been almost no seasonal letup in activity except among foundries serving the automobile industry. Output of motor car castings, moreover, seems to have passed its low point, since a number of important automotive foundries in western Michigan have increased their melt. Melters serving the tractor and machine tool industries are operating at a capacity rate. Inquiries have been put out for 6000 tons by stove and furnace interests in southern Michigan, indicating that they are getting ready for a seasonal increase in their manufacturing programs. The Oliver Farm Equipment Co., South Bend, Ind., has placed 3000 tons of foundry and malleable for delivery through the remainder of the year. The National Sewing Machine Co., Belvidere, Ill., is in the market for 1500 tons. Foundry grades from Lake Erie furnaces continue to be offered at concessions below the quotations of Chicago district producers. A cargo of boat iron was unloaded at Milwaukee last week.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	$18.51 to 19.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Plates.—Although specifications are not so large as recently, they still exceed shipments by a small margin. With 1000 tons to 1500 tons moving daily from local mills to the Milwaukee pipe fabricator, plates are in the strongest position among the finished rolled products. Demand for plates for oil storage tanks is also well sustained, 6500 tons of tankage having been placed in the Southwest during the week, with 15,000 tons of pending work still before the trade. Steel specifications from railroad car builders are expected to run out within the next month. While practically every important Western railroad has been mentioned as a probable buyer of equipment this fall, a relatively small amount of inquiry is actually in the market. Even if liberal orders were placed now, specifications for the steel could not reach the mills for at least 30 days. Plate deliveries range from four to six weeks on some specifications to eight, nine and 10 weeks on others. Mill prices are firm.

Ferroalloys. — New business is light, but shipments continue to go forward in record volume.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $39.76 to $41.76.

Structural Material.—Mill deliveries of plain material show improvement, now ranging from four to six weeks. While one important local producer reports that the week's specifications were equal to shipments, the trend is undoubtedly toward a further reduction of backlogs. Competition among fabricators is still keen, with bids on current work low, but the amount of prospective work likely to mature this fall has assumed encouraging proportions. Among definite inquiries that have come out during the week is one for 4850 tons from the Great Northern Railway, representing 1930 bridge requirements. The Milwaukee Electric Railway & Light Co. is about to place 2000 tons for an office building at Milwaukee. The Pittsburgh Plate Glass Co. has awarded 2700 tons for a plant at Oklahoma City, Okla., to the Muskogee Iron Works. Plain material prices are unchanged.

Mill prices on plain material, per lb.: 2.05c. base, Chicago.

Bars.—Announcement that the Ford Motor Co. will supply all of its bar requirements from its own mills in September is of wide interest, since steel producers in this and other districts will be adversely affected. Bar demand from other automobile manufacturers continues to diminish as preparations go forward for the bringing out of new models. Improvement in specifications is expected some time in the first half of September, if not before. Meanwhile, deliveries from local mills have shortened, now ranging from four to six weeks. Steel requirements of tractor manufacturers are expected to show little reduction, in view of large orders recently received from the Soviet Government. Road machinery makers are reported less active than earlier in the year. Mill prices on mild steel bars are firm at 2.05c. a lb., Chicago. Backlogs of mills rolling alloy steel bars continue to decline in keeping with the reced-

ing operations of the automobile industry. There continues to be a well diversified demand for iron bars, part of it attributable to the recent tense situation in soft steel bars. Releases in rail steel bars are gradually tapering. Mill operations are well sustained, partly because of the building up of stocks of fence posts for the fall trade.

Sheets.—Recent cool weather has resulted in better mill operations, which now range from 75 to 80 per cent of capacity. Producers are booked three to four weeks ahead. Receipt of specifications from a Milwaukee builder of automobile bodies indicates that the leading Wisconsin motor car builder is getting under way on the production of new models. Weakness in prices has been confined mainly to galvanized sheets, with competition most severe in the Southwest.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3c. to 3.05c.; No. 24 galv., 3.65c. to 3.75c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Strip Steel.—Demand for hot-rolled strip continues to taper, but there has been no further reduction in specifications for cold-rolled material, output of which remains at 65 per cent of capacity. For mill prices see page 489.

Cast Iron Pipe.—Industrial buying is fair, but there are few municipal lettings and business from railroads and utilities is light. Operations of pipe foundries range from 60 to 70 per cent. Demand will improve in the fall if work now in engineers' offices reaches the market. Madrid, Neb., has awarded 120 tons of 2, 4 and 6-in. to the Central Foundry Co. Lamar, Colo., took bids Monday on 2300 tons of 14-in. and 350 tons of 4 to 10-in. centrifugal pipe. Royal Oak, Mich., also received tenders Monday on 450 tons of 6 and 8-in. Class B. The South Park Commissioners, Chicago, will take general contract figures Aug. 21 on 500 tons of 2 to 32-in. Class B. Prices are unchanged.

Prices per net ton, del'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $49.20 to $50.20; Class A and gas pipe, $3 extra.

Rails and Track Supplies.—Local rail mills are still running at a 75 per cent rate, but will reduce operations toward the end of the month. The fall rail buying movement is expected to set in within the next four to six weeks. Bookings in track fastenings are of a routine character.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Reinforcing Bars.—An increase in the amount of live pending work has encouraged distributers, although lettings are still only of fair proportions. Bookings in concrete bars so far this year has been 15 to 20 per cent smaller than during the same period in 1928. The decline is ascribed largely to a falling off in local apartment house and public school construction. Competition for current business is keen, with prices flexible.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts have improved somewhat, but there has been a sharp drop in releases of small rivets because of the decline in automobile production. The customary summer slump in bolt and nut consumption by the farm equipment manufacturers has not materialized, specifications from tractor plants being particularly good.

Wire Products.—Specifications thus far in August have shown some improvement over those of the corresponding period last month, releases from jobbers being notably good for the season. It is too early for buyers to take interest in contracts and prices have not yet become sufficiently stabilized to encourage much new business of any kind. The trade is no longer so much concerned about mail-order-house sales of nails, barbed wire and fencing at blanket delivered prices with the freight allowed, believing that this development has been given more attention than it deserves. It is pointed out that sales through that channel do not constitute more than 5 per cent of the total consumption of the three products. For mill prices see page 489.

Coke. — Shipments of by-product foundry coke reflect a sustained melt throughout the territory served by local ovens. Prices continue at $8 a net ton, ovens.

Old Material.—Heavy melting steel has advanced on purchases of 15,000 tons by one independent steel producer and odd lots by another at $15.75 a gross ton, delivered. The price paid justifies the recent advancing tendency of the market when activity was confined to trading among dealers, although it falls short of the figures paid on considerable railroad material. Consumers contend that they are well stocked with scrap and that their requirements in September are likely to diminish. Sellers, while recognizing the possibility of reduced steel output next month, believe that consumption will still be large in comparison with the supply of scrap. Reduced output of scrap by automobile makers and other industries has prevented the accumulation of a large floating supply. Outside of steel works grades, the old material list has been quiet, with consumer purchases confined to scattered lots. Every test of the market, however, has brought out a higher price. The Rock Island took bids on a list of 3000 tons yesterday.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$15.25 to $15.75
Shoveling steel	15.25 to 15.75
Frogs, switches and guards, cut apart, and misc. rails	16.75 to 17.25
Hydraul. compressed sheets	13.50 to 14.00
Drop forge flashings	10.50 to 11.00
No. 1 busheling	13.25 to 13.75
Forg'd cast and r'l'd steel carwheels	18.75 to 19.25
Railroad tires, charg. box size	18.75 to 19.25
Railroad leaf springs cut apart	18.75 to 19.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings	14.50 to 15.00
Low phos. punchings	17.00 to 17.50
Low phos. plates, 12 in. and under	16.75 to 17.25
Blast Furnace Grades:	
Axle turnings	12.50 to 13.00
Cast iron borings	10.25 to 10.75
Short shoveling turnings	10.25 to 10.75
Machine shop turnings	7.00 to 7.50
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.75 to 18.25
Cupola Grades:	
Steel rails less than 3 ft.	17.50 to 18.50
Steel rails less than 2 ft.	19.00 to 19.50
Angle bars, steel	17.00 to 17.50
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	17.00 to 17.50
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.50 to 22.00
Iron car axles	26.50 to 27.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
No. 1 agricultural cast	13.25 to 13.75
Stove plates	12.25 to 12.75
Grate bars	11.75 to 12.25
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.16c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.15c. to 2.35c.
Reinforc'g bars, rail steel	1.85c. to 1.95c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (⅞ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅝ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

The Michigan Steel Corporation, Detroit, has moved its Detroit offices to 2400 New Union Trust Building, at Congress and Griswold Streets, that city.

New York

Pig Iron Sales Total About 10,000 Tons—Steel Orders Fall Off—8100 Tons Awarded for Subway

NEW YORK, Aug. 20.—Sales of pig iron in this district during the past week, at about 10,000 tons, were slightly smaller than in the previous week. Shipments on contracts are in good volume, and there is a fair total of new inquiry for foundry iron, but most buyers appear to be interested only in small lots for early delivery. Exceptions are an inquiry for 1000 to 2000 tons of foundry iron for delivery in the third and fourth quarter and another for 1000 tons for third quarter delivery, with shipments extending into the last quarter. Southern furnaces continue to be active factors, but sales are reported to have been small, although the new rail and water freight rates, via Savannah, with free lighterage in New York Harbor on 200 tons or more, make it possible to reach certain New York tidewater plants at a low rate. The free lighterage extends up the Hudson River to Edgewater, N. J., down the harbor to Sixty-ninth Street, Brooklyn, up the East River to Melrose Station and includes the Gowanus Canal and Newtown Creek in Brooklyn. Buffalo furnaces are endeavoring to maintain $18 a ton, base, on foundry iron, but $17.50 a ton has not entirely disappeared, although it is less common than a week or more ago. Eastern Pennsylvania sellers have quoted $19 to $19.50 a ton, furnace, on sales into this district. Although Alabama furnaces quote $14 a ton, Birmingham, for foundry grade and $13 a ton for basic iron, sales of foundry have been made at about $13 a ton when a sizable tonnage was involved.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $22.91
*Buf. No. 2, del'd east. N. J.	20.78 to 21.28
East, Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 21.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 22.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Ferroalloys.—Demand for spiegeleisen is only moderate. Probably about 1000 tons has been placed in the last few weeks for spot and early delivery at unchanged quotations. No new business in ferromanganese is reported. Specifications on contracts continue heavy.

Finished Steel.—Business in the past week has tapered somewhat as a result of seasonal conditions. However, mills look for the slowing down in buying to be of short duration and already there are indications in some lines of better bookings. Production continues at capacity, with deliveries of bars, shapes and plates ranging from four to six weeks. Prices are firm, with structural shapes quoted at 2.19½c., New York, and plates at 2.22½c. Structural steel is less active than a week ago, but prospects are favorable for a large volume of lettings in the immediate future. The outstanding award of the past week was 8100 tons for route 107, section 6, of the New York subway. Another important letting was 7000 tons for a Newark, N. J., bank building. Inquiry has been made for 5800 tons for Kings County Hospital in Brooklyn. Sheet steel specifications and orders have been of fairly good volume, but have declined from those of the previous few weeks. Galvanized sheets are selling at 3.50c., Pittsburgh, and black at 2.85c. Blue annealed stock is firm at 2.35c. for No. 13 gage. Weakness persists in wire goods. Common wire nails are being sold at $2.55 per keg, Pittsburgh, or lower. Plain wire is priced at 2.40c. a lb., Pittsburgh. The Nippon Oil Co. has postponed for 30 days action on its export inquiry for 19,000 base boxes of tin plate.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Reinforcing Bars. — The Kalman Steel Co. will furnish 800 tons of bars for the new Chevrolet assembly plant at Tarrytown, N. Y. Otherwise, awards have been for jobs taking only small tonnages. Fresh inquiries have been light, but mills are well engaged on a substantial volume of orders ranging from 25 to 100 tons each. Prices are steady and unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Cast Iron Pipe. — Prices are unchanged, ranging from $31 to $33 a ton, f.o.b. Northern foundry. Most of the current buying is confined to orders for a carload to slightly less than 100 tons for privately owned companies. Some small export orders have been closed for shipment to the Philippine Islands and to Central American markets. The Plainfield Union Water Co., Plainfield, N. J., has closed on 288 tons of 12-in. water pipe with a Northern maker. Bloomfield, N. J., has opened bids on 150 tons of 6-in. Class C pipe.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.60 to $34.60; 4-in. and 5-in., $36.60 to $37.60; 3-in., $43.60 to $44.60. Class A and gas pipe, $3 extra.

Warehouse Business.—Consumer activity continues in the purchase of small lots of material from stock, but at the present rate August business is expected to be smaller than that of last month. There is a fair demand for galvanized sheets, but black sheets are quiet and prices on both grades are subject to some concessions. Buying of structural material is limited to small lots, and a renewal of activity is not expected until next month.

Coke.—The market is inactive except for shipments on contracts. Standard furnace coke is unchanged at $2.75 to $2.85 a net ton, Connellsville.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Special brands of beehive foundry coke are quoted at $4.85 a net ton, ovens, or $8.56 a net ton, delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 a net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Old Material.—Consumer buying of scrap is small. Prices of all grades are unchanged. Heavy melting steel continues active among brokers who are filling contracts, but all grades of cast scrap are quiet and prices are lacking in strength. Brokers are paying $14.50 a ton for heavy breakable cast to deliver on $15 contracts, but users are only offering $14 to $14.50 for new contracts.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.75 to $13.35
Heavy melting steel (yard)	8.00 to 9.75
No. 1 hvy. breakable cast	10.75 to 11.75
Stove plate (steel works)	8.00 to 8.25
Locomotive grate bars	8.25 to 8.75
Machine shop turnings	7.75 to 8.00
Short shoveling turnings	7.75 to 8.00
Cast borings (blast furn. or steel works)	7.00 to 7.75
Mixed borings and turnings	6.75 to 7.75
Steel car axles	19.50 to 20.00
Iron car axles	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	10.75
Forge fire	9.75 to 10.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
Rails for rolling	13.25 to 13.75
Cast iron carwheels	12.50 to 13.00
Stove plate (foundry)	8.00 to 8.50
Malleable cast (railroad)	14.00 to 14.50
Cast borings (chemical)	10.00 to 10.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Detroit Scrap Strong

DETROIT, Aug. 20.—While there have been no price changes the past week on old material in this district, there is an apparent shortage in offerings of some grades at prevailing prices. The strength of the market is shown by the fact that there seems to be enough material to be had by paying a premium.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$14.25 to $14.75
Borings and short turnings	9.00 to 9.50
Long turnings	8.50 to 9.00
No. 1 machinery cast	12.50 to 13.00
Automobile cast	13.00 to 13.50
Hydraul. comp. sheets	14.00 to 14.50
Stove plate	9.00 to 9.50
New No. 1 busheling	12.50 to 13.00
Old No. 1 busheling	11.00 to 11.50
Sheet clippings	8.75 to 9.25
Flashings	13.00 to 13.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ⅛ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.90
No. 9 gal. wire, per 100 lb.	3.35
Com. wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Cleveland

Specifications Off Somewhat, But Full Capacity Production Continues—Better Sales of Pig Iron

CLEVELAND, Aug. 20.—Specifications for finished steel fell off somewhat the past week. However, mills in this district continue to operate at close to 100 per cent of capacity. While deliveries on most products as yet show little gain, the mill backlogs will be reduced considerably by Sept. 1, unless there is marked gain in specifications. No cancellations or suspensions from the motor car industry are reported, but the amount of steel that is being taken by that industry has been reduced sharply. Local forge and stamping plants engaged in automobile work are taking less steel than recently because of a curtailment in operations.

Automobile manufacturers are going rather slow in getting under production schedules on new models until their stocks of old cars are disposed of. Stocks of used cars have also been very large but these are believed to have been cut down considerably. While automobile manufacturers are buying forgings and other parts, they are following a conservative policy by placing orders for comparatively small quantities. The feeling in the automotive industry appears to be rather optimistic, with expectation, however, that it will hardly get back this year to the pace it set during the first half.

Metal working plants outside of the automotive field as a rule are keeping up close to recent operations. Manufacturers of steam shovels are still crowded with orders and are operating their plants at capacity.

Backlogs of auto body sheets have been about wiped out and mills need orders for hot and cold-rolled strip steel. Some of the strip sheet mills also need business. A Cleveland mill is now making regular water shipments of steel bars to Toledo in addition to Detroit.

Pig Iron.—Sales gained somewhat the past week, during which Cleveland interests took orders for 20,000 tons of foundry and malleable grades, as compared with 15,000 tons in the previous week. A large proportion of the business entered is for the fourth quarter now that the present quarter is more than half over. The reduction in price of Southern foundry iron has led some producers of Southern grades to seek business in Cleveland and in other parts of northern Ohio, but with present foundry practice the demand for iron with high phosphorus content is quite limited in this territory. Consequently it is not expected that Southern iron will become much of a factor here. While prices on Southern iron are not clearly defined, this iron is at present quoted at $13 to $13.50 in this territory. Prices on Northern foundry iron are unchanged at $18.50, Cleveland, for outside shipment, $19 for local delivery and $20, Lake furnace, for Michigan delivery. Shipments, which fell off during the first half of the month, increased the past week through releases from some of the foundries in the automotive field. Stove and furnace manufacturers continue good operations and are taking iron freely. Low phosphorus iron is moving slowly.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	$19.00 to 19.50
Malleable	19.50
Ohio silvery, 8 per cent	28.00
Basic Valley furnace	18.50
Stand. low phos., Valley	26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—The movement is maintaining the pace set earlier in the season and it is expected that water shipments will be in excess of 10,500,000 tons this month. Most consumers will continue present shipping schedules at least through September. Shippers see no reason to revise their recent predictions that the season's movement will exceed 65,000,000 tons and break all previous records.

Semi-finished Steel.—The demand for sheet bars, billets and slabs is not quite as heavy as recently and pressure for deliveries has disappeared. Shipments are being made against $35 contracts. Consumers generally are covered for the quarter and there is no new inquiry. A leading local producer continues to operate at 100 per cent of capacity and is gaining slightly on deliveries, although this plant is fully committed for nearly two weeks.

Steel Bars, Plates and Shapes.—The volume of business was not so heavy the past week as during the previous week. However, the tonnage entered so far this month does not show a marked falling off from the corresponding period of July. The decline in specifications is most noticeable in steel bars, owing to the slowing down of the automotive industry. Plates are still moving fairly well in small lots, but deliveries by some of the mills are now being promised in two weeks. In the building field there is good inquiry for small lots of fabricated material. The McClintic-Marshall Co. was low bidder for the Maumee River Bridge, Toledo, requiring 7000 tons. Five hundred tons of sheet steel piling will be required for the Ohio Savings Bank & Trust Co. Building, Toledo. Prices are steady at 1.90c. to 1.95c., Cleveland, for steel bars and 1.95c., Pittsburgh, for plates and shapes.

Sheets.—While business is fair, shipments exceed incoming orders, so that backlogs are being slowly re-

duced. Failing off in the demand from the recent peak is more noticeable in auto body sheets than in other grades, and some of the mills have caught up on deliveries on that grade. Automobile companies are restricting their purchases to rather small lots, apparently not wishing to make heavy commitments for extended deliveries until they know what their operating schedules will be during the next few weeks. Most mills are still comfortably filled on black sheets for three or four weeks. While the demand for wide blue annealed sheets is holding up well, some of the mills are in need of blue annealed tonnage. Considerable demand has developed recently from barrel manufacturers for No. 28 gage material for drums for insecticides. Prices appear better stabilized than recently. Black sheets are firm at 2.85c., Pittsburgh, and sheet mills are holding quite firmly to 2.35c. for blue annealed. While 3.50c. on galvanized has not disappeared, most mills are holding to 3.60c. and are taking business at that price.

Wire Products.—Demand for wire is slow. Plain wire is commonly quoted at 2.40c., Cleveland, for outside shipment and to local jobbers, although some of the mills are adhering to 2.50c. for manufacturers wire for local delivery. There appears to be no definite price basis for nails for shipment to competitive points. For local delivery some business is being taken in mixed car lots at $2.65 per keg.

Warehouse Business.—The seasonal lull is in evidence and business is lighter than last month. However, sheets are moving in good volume. No price concessions are reported.

Strip Steel.—Specifications for hot-rolled strip continue rather light and some of the mills need tonnage, particularly in wide material. Prices appear firm, although there is little new business. The demand for cold-rolled strip is also slow. While some of the mills have enough business to keep them operating well for three or four weeks, others need tonnage. The 2.85c. Cleveland and Pittsburgh price is generally quoted, although there has not been enough business recently to test this price, most consumers being under contracts at 2.75c.

Coke.—While shipments of foundry coke are fair, there is not much new business. Premium brands of Connellsville foundry coke are steady at a maximum of $4.85 a net ton. Ohio by-product foundry coke remains at $8.25, Painesville. By-product ovens are taking a fair amount of business in coke for domestic use, which is bringing $4.50, Ohio ovens, for egg size and $4 for nut.

Old Material.—While scrap is coming out somewhat more freely than recently, the market remains firm. There is some activity among dealers who are covering against short orders, but no new buying by mills is reported. A Cleveland mill is taking steel making scrap more liberally than recently but is not releasing orders for blast furnace material. Dealers are paying $15.25 to $15.50 for ordinary No. 1 heavy melting steel for one Cleveland mill and $16.50 for selected scrap for another local consumer. Compressed sheet steel is higher locally. In the valley district No. 1 heavy melting steel is bringing $18.50 and compressed sheet steel $18 from dealers.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$15.25 to $15.75
No. 2 heavy melting steel	14.50 to 15.00
Compressed sheet steel	15.50 to 16.00
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings	13.00 to 13.25
Machine shop turnings	9.75 to 10.25
Short shoveling turnings	11.50 to 11.75
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	16.00 to 16.50
No. 1 busheling	13.25 to 13.75
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades:	
Low phos., forging crops	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos., sheet bar crops	18.00 to 18.50
Low phos., plate scrap	18.00 to 18.50
Blast Furnace Grades:	
Cast iron borings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
No. 2 busheling	10.50 to 10.75
Cupola Grades:	
No. 1 cast	17.50 to 18.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.50 to 19.00
Miscellaneous:	
Railroad malleable	18.00 to 18.50
Rails for rolling	16.25 to 16.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.55c.
Steel bands, No. 12 to ⅞-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more: 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more: 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Philadelphia

Plate and Shape Mills Well Engaged—Pig Iron Price Firmer, But Untested by Large Sale

PHILADELPHIA, Aug. 20.—Plate mills are well engaged with current specifications and in most cases have tonnage in sight sufficient to make the August total of business larger than in July. Shape mills are also operating full and have received heavier orders this month than last, with the smaller fabricating shops increasingly active. The steel bar market, however, is quiet and deliveries are fairly prompt. Sheets are also inactive and black and galvanized sheet prices are still lacking in strength.

Bids opened by the Pennsylvania Railroad on plates, shapes, bars and sheets brought out quotations of 1.90c. to 1.95c., f.o.b. mill, on bars, 1.85c. to 1.95c., mill, on plates and 1.90c. to 1.95c., mill, on shapes. Sheet bids were 2.20c. for No. 10 blue annealed, 2.35c., mill, for No. 13 blue annealed, 2.85c. to 2.95c., mill, for black sheets and 3.50c. to 3.60c., mill, for galvanized. The Pennsylvania Railroad is reported to have closed on a tonnage of wrought iron pipe for use in electrification work.

Pig Iron.—Sellers of Southern pig iron are still competing for tonnage in eastern Pennsylvania, offering foundry iron at $13 to $14 a ton, f.o.b. furnace, on a rail and water freight rate for small lots, of $5.25 a ton, loaded on cars Philadelphia. Eastern Pennsylvania furnaces have developed a firmer attitude in the past week and show no inclination at present to offer any concession from $21 a ton, base, on foundry iron, but no sizable tonnage has been closed to offer a test of this price. Birmingham furnace interests are reported by sellers of managanese ore to be negotiating for more than their usual ore requirements, evidently for the purpose of increasing the manganese content of their pig iron to make it more satisfactory to Northern users. Inquiry is fair but mostly for small lots of foundry iron. An exception is 500 tons of No. 2 plain and No. 1X for the American Engineering Co., Philadelphia. Buyers are beginning to show some interest in their fourth-quarter requirements, but have not yet issued inquiries for the last quarter. Basic iron is quiet, with the two leading buyers in this district covered for the remainder of this quarter.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X	22.26 to 22.76
Basic (del'd east. Pa.)	19.75 to 20.25
Gray forge	20.00 to 20.50
Malleable	21.25 to 21.75
Stand. low phos. (fo.b. N. Y. State furnace)	22.00 to 23.00
Cop. br'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.04
Va. No. 2X, 2.25 to 2.75 sil.	24.54

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Demand is small, but mills still have a fair backlog of orders on

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their books and are maintaining 1.95c., Pittsburgh, or 2.27c., Philadelphia. At the opening of bids by the Pennsylvania Railroad on 6500 tons of bars, 1.90c., f.o.b. mills, was quoted by makers at Pottsville, Pa., and Steubenville, Ohio, and 1.95c., f.o.b. mill, by the other bidders.

Reinforcing Bars.—Billet steel bar prices show no improvement, and, with makers quoting down to 1.95c., Pittsburgh, or 2.27c., delivered Philadelphia, usually with no extra for cutting to length and occasionally shading this price, rail steel bar mills are booking but little business. The quotation on rail steel bars is 1.95c., Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, with no extra for cutting to length. The Magee Carpet Co., Bloomsburg, Pa., has awarded 100 tons of rail steel bars for a new building to the Danville Structural Steel Co. The Soldiers and Sailors Memorial Bridge, Harrisburg, Pa., requiring 3000 tons of bars, has been awarded to the Taylor-Davis Co.

Shapes. — Most eastern Pennsylvania shape mills are operating full and in some instances expect that August business will be larger than that for July. Orders from small fabricators are beginning to increase and on certain sizes mills are quoting slight delays in delivery. Prices are unchanged at 1.95c. to 2.05c., f.o.b. nearest mill to consumer, or 2.01c. to 2.11c., delivered Philadelphia. Bids on 2550 tons of shapes, opened by the Pennsylvania Railroad were 1.95c., f.o.b. mill, with two exceptions, which were 1.90c., f.o.b. Pottsville and f.o.b. Steubenville, Ohio, or Pittsburgh.

Plates. — Delays in deliveries are slightly longer than on other steel products, with mills well engaged and expecting August business to exceed July. Prices are firm at 2.05c., Coatesville, or 2.15c., delivered Philadelphia. At the Pennsylvania Railroad opening of bids on 20,000 tons of plates quotations were 1.95c., f.o.b. mill, except for bids of 1.85c., f.o.b. Cleveland, and 1.90c., f.o.b. Steubenville, or Pittsburgh.

Sheets.—Blue annealed sheet quotations are firm at 2.35c. per lb., Pittsburgh, for No. 13 gage and 2.20c., Pittsburgh for No. 10 gage, light plates, blue annealed. Black sheets are 2.85c., Pittsburgh, or 3.17c., delivered Philadelphia, and galvanized are 3.50c. to 3.60c., Pittsburgh, or 3.82c. to 3.92c., delivered Philadelphia. An automobile body builder in this district has closed a contract with a Middle-Western manufacturer of trucks to supply disk wheels on its output for the rest of this year. Bids on sheets for the Pennsylvania Railroad were 2.35c., f.o.b. mill for No. 13 gage and 2.20c., mill on No. 10 gage, quoted on 400 tons of blue annealed sheets, 2.85c. to 2.95c., f.o.b. mill, quoted on 300 tons of black sheets and 3.50c. to 3.60c., mill, quoted on 100 tons of galvanized sheets.

Imports.—In the week ended Aug. 17, a total of 6320 tons of iron ore arrived at this port from Algeria, 3909 tons of chrome ore from Cuba, 50 tons of pig iron from Sweden and 225 tons of spiegeleisen from the United Kingdom. Steel arrivals consisted of 106 tons of structural shapes from Belgium and 71 tons from Germany, 23 tons of steel bars from Germany and 15 tons of steel bands from France.

Old Material.—All grades are inactive, especially cast scrap. Eastern Pennsylvania consumers of heavy breakable cast are not offering more than $14 a ton on new purchases, although dealers are paying $14.50 a ton to fill contracts. Shipments of No. 1 heavy melting steel are in good volume to a consumer at Bethlehem, Pa., but mills at Coatesville, Pa., and Claymont, Del., have found it necessary to curtail shipments on contracts, which have been too heavy recently. A Claymont, Del., mill, which usually disposes of its low phosphorous plate scrap is using it, being unable to obtain enough for it from other consumers.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$16.50 to $17.00
Scrap T rails	16.00 to 16.50
No. 2 heavy melting steel	12.50 to 14.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.50 to 15.50
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.75
Heavy breakable cast (for steel works)	15.00
Railroad grate bars	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under	22.00 to 23.00
Couplers and knuckles	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.00
Shafting	19.00 to 19.50
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00
Cast iron carwheels	16.50 to 16.75
No. 1 cast	16.50 to 17.00
Cast borings (for chem. plant)	14.50
Steel rails for rolling	16.50 to 17.00

Electrochemists' Program for Fall Convention

Arrangements are rapidly being completed for the annual fall convention of the American Electrochemical Society to be held at the William Penn Hotel, Pittsburgh, Sept. 19 to 21. A symposium on "Contributions of Electrochemistry to Aeronautics" is attracting considerable attention and papers are already in hand for the session. Dr. J. D. Edwards of the Aluminum Co. of America, New Kensington, Pa., will preside. Among those who will take an active part are Edward P. Warner, editor of *Aviation;* Dr. George W. Lewis, director of aeronautical research, national advisory committee for aeronautics, and Starr Truscott, assistant to Dr. Lewis.

There will also be sessions on the electroplating and refining of various metals, including chromium, as well as sessions on organic electrochemistry. An attractive open discussion has been arranged for by the officers of the electrothermic division of the society and a number of electric furnace experts will participate. Some of the papers, already accepted, are the following:

"Recent Developments in the Analysis of Carbon in Iron and Iron Alloys," by N. A. Ziegler, of the Westinghouse Electric & Mfg. Co., Pittsburgh.

"The Use of Tantalum as Cathode for the Electrodeposition of Copper," by L. W. Strock and Hiram S. Lukens, of the University of Pennsylvania, Philadelphia.

"Cathode Potentials and Electrode Efficiencies of Copper in Copper Cyanide—Sodium Cyanide Solutions," by G. M. Smith and J. M. Breckenridge, of Vanderbilt University, Nashville, Tenn.

"The Determination of Sulphate in Chromic Acid and in Chromium Plating Baths," by H. H. Willard and Richard Schneidewind, of the University of Michigan, Ann Arbor, Mich.

"On the Road to Pure Iron and Some of its Indicated Properties," by T. D. Yensen, of the Westinghouse Electric & Mfg. Co., Pittsburgh.

Social features will include a smoker, a dinner and a dance.

The spring meeting of 1930 will be held in St. Louis. Carl Hambuchen and Gaston DuBois are the local committee. The headquarters will be held at the Coronada Hotel but the date has not yet been definitely decided, although it will probably be the last week in May. The symposium scheduled will deal with "Hydrometallurgy of Copper, Silver, Zinc, Lead and Cadmium," with T. H. Donahue of the Anaconda Lead Products Co. as chairman.

A motor boat engineering conference, sponsored by the Society of Automotive Engineers and the National Association of Engine and Boat Manufacturers, will be held at the Whittier, 461 Burns Drive, Detroit, Aug. 31.

MOVEMENT OF LAKE SUPERIOR ORE, IN GROSS TONS

Port	July, 1929	July, 1928	Season to Aug. 1, 1929	Season to Aug. 1, 1928
Escanaba	1,071,570	904,613	3,214,821	2,372,815
Marquette	634,369	573,426	2,262,363	1,448,674
Ashland	1,307,599	1,023,854	4,105,548	2,892,629
Superior	3,087,305	2,523,721	9,515,349	6,477,514
Duluth	3,484,009	2,970,629	10,429,324	7,539,541
Two Harbors	1,086,030	983,456	3,383,415	2,543,651
Total	10,670,882	8,979,699	32,910,820	23,274,824
Increase	1,691,183	.....	9,635,996	.....

Pacific Coast

Pipe Line at Everett, Wash., Will Take 10,000 Tons of Steel —Cast Iron Pipe More Active

SAN FRANCISCO, *Aug. 17 (By Air Mail)*.—Demand for iron and steel products on the Pacific Coast has fallen off, as is usual at this season of the year, yet a fair volume of business has been booked. The cast iron pipe market was the most active of the week, about 3000 tons having been placed, and several fair-sized tonnages came into the market for figures. The Western Pipe & Steel Co. took 1928 tons of plates for a penstock and surge tank at Tacoma, and bids have been called for on 10,000 tons of plates for a riveted steel pipe line at Everett, Wash.

Pig Iron.—Foundry operations continue to show little signs of improvement, and as a result sales and inquiries are limited to small tonnages. Prices are unchanged.

Bars.—The largest inquiry for reinforcing bars calls for 2300 tons for a wharf at the foot of Ninth Avenue, Oakland, bids on which have been opened. Prices appear to be firmer now than at any time in more than a year, and 2.30c., base, is being quoted on carload lots, with 2.60c. applying on lesser lots. In the Los Angeles district, prices are $2 a ton higher. Movement of merchant steel bars is confined to unimportant lots. On this class of material, 2.35c., c.i.f., is firm.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Plates.—Bookings, other than the 1928-ton lot for Tacoma, mentioned above, were in lots of less than 100 tons. Everett, Wash., will open bids Aug. 28 on 10,000 tons for a riveted pipe line. Alternate bids will be taken on wood and reinforced concrete pipe. No award has yet been made of 3000 tons for a pipe line at Bremerton, Wash. Prices appear firm at 2.35c., c.i.f. Coast ports.

Shapes.—Structural steel bookings were fairly large this week. The Judson-Pacific Co. took 400 tons for a factory for the Hazel-Atlas Glass Co., Oakland, 100 tons for an apartment in San Francisco, 100 tons for a memorial building in Vallejo, Cal., and 200 tons for a hangar for the Boeing Air Transport at Cheyenne, Wyo., placed through the Austin Co. of Washington. The Western Iron Works booked 300 tons for a store on Market Street, San Francisco. Shapes are firm at 2.35c., c.i.f. New inquiries include 350 tons for a Masonic Home at Decoto, Cal.

Cast Iron Pipe.—Demand for cast iron pipe has improved during the past week or 10 days. A fair-sized amount is up for figures. The Southern Pacific Co., San Francisco, has placed 1974 tons of 4 to 8-in. Class 150 pipe with various unnamed interests. The Pacific States Cast Iron Pipe Co. took 248 tons of 4 to 8-in. Class 150 pipe for a golf course at Palo Alto, Cal., for Stanford University. The United States Pipe & Foundry Co. booked 371 tons of 4 to 8-in. Class 150 pipe for the Naval ammunition depot, Hawthorne, Nev., and 106 tons of 8 and 18-in. Class 150 pipe for Alhambra, Cal. F. A. Rhodes secured 145 tons of 4 and 6-in. Class B pipe for San Diego. New inquiries include 1385 tons of 6 to 12-in. Class B or 150 pipe for the East Bay Municipal Utility District, Oakland, bids on which will be opened Aug. 19. The Spring Valley Water Co., San Francisco, has taken bids on 182 tons of 8-in. Class 150 pipe. Alturas, Cal., has opened bids on 199 tons of 4 to 8-in. Class B pipe. The R. E. Hazard Contracting Co. was low bidder on 144 tons of 4 and 6-in. Class B pipe for Plata Avenue and on 201 tons of 4 and 6-in. Class C pipe for El Prado Avenue, San Diego.

Railroad Material.—San Francisco will open bids Aug. 23 on 550 tons of 98 to 120-lb. girder rails, 21,000 tie plates, 13,000 brace tie plates, 130 kegs of track spikes, 30 kegs of track bolts and 82 special layouts.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Southern Pig Iron Going to Outlying Territories—Steel Demand Continues Well Above Seasonal Average

BIRMINGHAM, Aug. 20. — District sales of pig iron are growing less owing to the fact that third quarter requirements generally have been covered. One company's third quarter sales to district consumers have slightly exceeded the probable make, and as a whole the margin between bookings and probable make is close. The extent that stocks are reduced will depend largely on the volume of sales to outside territories. Continued pressure by furnace interests for business in competitive territories has resulted in several round tonnage orders from the Middle West and Eastern territories. An increase in shipments in the past two weeks has been brought about by loadings for outside territories, as shipments to district consumers have shown very little increase, if any. Furnaces are maintaining a base price of $14.50 for No. 2 foundry for the district. Reported concessions of as much as $1.50 a ton in competitive territories on basic iron are not confirmed here but are not denied. The No. 1 furnace of the Republic Iron & Steel Co. was blown out for repairs on Aug. 14. The Alabama City furnace of the Gulf States Steel Co. was changed from basic to foundry iron on Aug. 12. Sixteen furnaces are active. Of this number, nine are on foundry, six on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$14.50
No. 1 fdy., 2.25 to 2.75 sil.	15.00
Basic	14.50

Finished Steel.—Backlogs of structural shapes and plates are practically as large now as three weeks ago, being sufficient for over three weeks' operations at the present rate. Backlogs of bars have dropped gradually during the past few weeks, but not to the extent that they have in comparable periods in the past, and new business is considered good. Sheet demand improved last week after a slight decline in the previous week. Wire products business is still well above normal for this season. Steel rail orders are being rapidly worked off, though no date has been set for closing the mill. Prices on galvanized sheets have been reduced to 3.75c. from 3.85c. All other prices are the same. With the orders booked last week and the others that are pending, structural steel fabricators will make a good showing for August in spite of the light business during the first half of the month. New orders of the Virginia Bridge & Iron Co. include 375 tons for railroad sheds at Birmingham; about 400 tons for a railroad station at Atlanta and 180 tons for the Lamson & Sessions Bolt Co. plant at Birmingham. The Ingalls Iron Works Co. has an order for 440 tons for the S. H. Kress store at Greenville, S. C. Reinforcing bar business is better than had been expected and operating schedules are still better than those of one year ago. The Tennessee company is working seven out of nine open-hearths at Ensley, a gain of one since a week ago. All eight are active at Fairfield and the Gulf States Steel Co. continues to work five of its six at Alabama City.

Cast Iron Pipe.—Dullness in the Southern territory is more pronounced and pressure pipe makers are relying largely on distant terri-

tories for new business. Plants in the district are bidding on several fair-sized projects in the Middle West to be awarded within the next week. The American Cast Iron Pipe Co. has booked 2500 tons of 6 and 8-in. pipe for Detroit. A new order of the National Cast Iron Pipe Co. calls for 200 tons for Fulton, Miss. A small project at Nashville, Tenn., has been let to the Alabama Pipe Co. The project at Gadsden, Ala., requiring about 3000 feet of 12 to 18-in. pipe may be awarded this week. The Hollywood, Fla., project has been postponed indefinitely. Plants continue to ship close to their output with operations unchanged. Prices remain at $37 to $38 a net ton, Birmingham, for 6-in. and larger diameters.

Coke.—Specifications on foundry coke under contract are undiminished. Of a total of 1380 by-product ovens, 1322 are active.

Old Material.—Gradual improvement in demand for steel grades during the past several weeks has given the market more strength than it had shown since early spring. Scrap steel rail prices have advanced from $12.50 to $14 and an increase of 50c. a ton has been made in quotations for heavy melting steel, rails for rolling and tramcar wheels. Cast iron carwheels have advanced $1 a ton. Demand for cast iron grades of scrap remains sluggish.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	$11.50 to 12.00
Steel axles	21.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.50
Tramcar wheels	13.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Boston

Pig Iron Buying Slackens—Most Grades of Scrap Easier —Structural Steel Prospects Promising

BOSTON, Aug. 20.—Pig iron buying dropped to small proportions the past week, but indications are it will shortly be more active, as several foundries are privately asking prices on round tonnages. Mystic Iron Works sales were 3000 tons, and, with one exception, at $20.21 to $21.31 a ton, on cars furnace, for No. 2X and No. 1X. The exception was a car of No. 2X at $19.89 a ton, furnace, on a high freight rate. Additional sales of No. 2X Southern iron at or very close to $22.25 to $22.75 a ton, delivered, are reported, these prices figuring back to $14 and $14.50 a ton, base furnace, allowing for a 50c. a ton loading charge. While Buffalo furnaces are endeavoring to hold their price to $18 a ton, base furnace, differentials on No. 1X iron have been waived the past week.

Foundry iron prices per gross ton deliv'd to most New England points:

†Buffalo, sil. 1.75 to 2.25	$22.28 to $22.78
†Buffalo, sil. 2.25 to 2.75	22.78 to 23.28
*Buffalo, sil. 1.75 to 2.25	22.91 to 23.41
*Buffalo, sil. 2.25 to 2.75	22.91 to 23.91
East. Penn., sil. 1.75 to 2.25	22.65 to 23.15
East. Penn., sil. 2.25 to 2.75	23.15 to 23.65
Va., sil. 1.75 to 2.25	25.21
Va., sil. 2.25 to 2.75	25.71
*Ala., sil. 1.75 to 2.25	23.61
*Ala., sil. 2.25 to 2.75	24.11
†Ala., sil. 1.75 to 2.25	19.75 to 20.25
†Ala., sil. 2.25 to 2.75	20.25 to 20.75

Freight rates: $4.91 all rail from Buffalo, and $4.28 rail and water; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.
*All rail rate.
†Rail and water rate.

Cast Iron Pipe.—Newington, Conn., is asking bids on 2950 ft. of 10-in. pipe and 2500 ft. of 6-in., while Gardner, Mass., is in the market for 2000 ft. of 8 and 16-in. Current pipe business is confined to small tonnages placed privately. Foundries continue well sold ahead on small dimensions, but concessions are still obtainable on large pipe. Prices quoted openly on domestic pipe are: 4-in., $46.10 to $47.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $40.10 to $41.10; 16 to 20-in., $39.10. A $3 differential is asked on Class A and gas pipe. Last week French interests unloaded 2931 tons of pipe at Providence, R. I., for the Warwick, R. I., water system. This pipe was sold several months ago.

Reinforcing Steel.—With the exception of 140 tons for a Brookline, Mass., bridge, sales of billet steel bars the past week were again in small tonnages. About 900 tons for two local jobs, pending for some time, may be placed this week, and several bridge jobs in Maine and Rhode Island bring the prospective orders up to about 2000 tons. While 2.66½c. a lb., base, from stock is openly quoted, that price is being shaded on highly competitive business. On rail steel bars, the open price is 2.26½c. a lb., base, delivered common Boston freight rate points.

Fabricated Steel.—Fabricators are figuring quite a number of worthwhile jobs, including 1050 tons for a Boston bridge, 1000 tons for South Station canopies and several other jobs ranging from 200 to 400 tons. Other jobs that will come up for figuring soon are a $2,000,000 State office building at Hartford, Conn., a 400-ton bridge in Connecticut, a State bridge at Fall River, Mass., and another at Weymouth, and a sports arena at Hartford. Although the market is more active than it has been in several months, competition for jobs by fabricators is keen and some low prices are being made on the most attractive business.

Coke.—With numerous foundries closed for a week or two for vacations and with others reporting a noticeable slackening in orders for castings, there has been a letdown in specifications for by-product foundry coke, which remains at $11 a ton, delivered within a $3.10 freight rate zone. The absorption of the New England Coal & Coke Co. by the Koppers interests will have no bearing on fuel prices the remainder of 1929, at least, buyers having been protected by the old management.

Old Material.—The flurry in some Eastern markets occasioned by the high prices paid the Pennsylvania Railroad for scrap has not been reflected in New England. While the market here for steel mill borings is a shade firmer because of good buying and limited supplies, that for most other materials is easier. No. 1 heavy melting steel is now generally $12.25 to $12.50 a ton, on cars shipping point, with an occasional transaction at $12.75, whereas a week ago $12.50 was the minimum. Girder rails do not fetch more than $11 a ton now, against $11.25 a week ago, while mixed borings and turnings prices are off 10c. to 25c. a ton, and chemical borings 25c. Inside prices are being paid more often than outside for other kinds of material shipped to steel mills. Owing to increased offerings, textile machinery cast has dropped to $14 to $14.50 a ton, delivered New England, off 50c. a ton, but No. 1 machinery cast values hold well.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.25 to $12.75
Scrap T rails	11.50 to 12.00
Scrap girder rails	10.50 to 11.00
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Machine shop turnings	7.00 to 7.25
Cast iron borings (steel works and rolling mill)	6.50 to 6.75
Bundled skeleton, long	10.00 to 10.50
Forge flashings	10.50 to 10.75
Blast furnace borings and turnings	6.00 to 6.25
Forge scrap	9.00 to 9.25
Shafting	14.00 to 14.75
Steel car axles	18.00 to 18.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.75 to 10.00
Rails for rolling	12.50 to 13.00
Cast iron borings, chemical	9.75 to 10.00
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$14.00 to $14.50
No. 1 machinery cast	15.00 to 15.25
No. 2 machinery cast	13.00 to 13.25
Stove plate	11.00 to 11.50
Railroad malleable	18.00 to 18.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

St. Louis

Pig Iron Users Disposed to Hold Off—Scrap Scarce and Strong

ST. LOUIS, Aug. 20.—Pig iron users are still disturbed by uncertain prices and are disposed to mark time. While the chief consumers are well covered, numerous smaller interests still have iron to buy for the remainder of this quarter and for the last three months of the year. Consumption continues on a large scale, and shipments since Aug. 1 exceed those of the corresponding period last year. Sales reported total about 14,000 tons, the largest single transaction having been 4000 tons of foundry iron taken by a radiator maker from the St. Louis Gas & Coke Corporation. Stove and implement makers figured in the latest buying to the extent of about 3500 tons. About 3500 tons of malleable was included in the week's sales.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	$16.92 to 18.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—Business in sheets holds above the seasonal average, with blue annealed still leading in activity. Black sheets are in better demand, and the same is true of galvanized, particularly heavy corrugated material. Winding up of booked car business is reflected in a slowing down in plate specifications. Tin plate is moving in satisfactory volume. Structural fabricators complain of lack of new orders, particularly sizable jobs.

Old Material.—Strength characterizes the market for scrap iron and steel. Virtually all classes of material are strong, the one exception being cast, which has lagged for several weeks. The strongest section of the market comprises heavy melting steel and steel specialties, which have been marked up fractionally during the past several days. Little material is arriving, railroad deliveries having declined in volume, and practically nothing is coming from adjacent country shipping points. Yard stocks are small and assortments incomplete. Mills are resisting dealers' asking prices. Latest railroad offerings include the following lists: Chesapeake & Ohio, 6379 tons; Frisco, 10 cars; International Great Northern, 4300 tons; Chicago, Milwaukee, St. Paul & Pacific, three cars of mixed scrap and 1000 tons of rails; Burlington, 4900 tons, and Rock Island, 110 cars.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$14.75 to $15.25
No. 2 heavy melting or shoveling steel	14.50 to 15.00
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	17.00 to 17.50
Railroad springs	19.00 to 19.50
Bundled sheets	10.50 to 11.00
No. 2 railroad wrought	15.00 to 15.50
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	17.25 to 17.75
Machine shop turnings	7.00 to 7.50
Heavy turnings	10.00 to 10.50
Steel car axles	19.00 to 19.50
Iron car axles	26.50 to 27.00
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.75 to 14.25
Steel rails, less than 3 ft.	18.00 to 18.50
Steel angle bars	15.00 to 15.50
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	15.00 to 15.50
No. 1 railroad cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Buffalo

Pig Iron Seller Out of Market for Quarter

BUFFALO, Aug. 20.—Pig iron sales and inquiries are confined to small lots. The withdrawal of one furnace interest from selling for the remainder of this quarter has added strength to the market. Although prices are unchanged, there is talk of a 50c. a ton advance. Consumers in New England and elsewhere in the East, outside the immediate Buffalo district, are still able to buy foundry iron at $18, base, or slightly less in some instances, but prices in the district remain firm at the quotations below.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$19.50
No. 2X fdy., sil. 2.25 to 2.75	20.00
No. 1 fdy., sil. 2.75 to 3.25	21.00
Malleable, sil. up to 2.25	20.00
Basic	18.50
Lake Superior charcoal	27.28

Finished Steel.—Sales of more than 1000 tons of reinforcing bars are reported, including 800 tons for the Chevrolet assembly plant at Tarrytown, N. Y. Four school jobs account for 200 tons. An addition to the Buffalo works of the General Electric Co. calls for 800 tons, which probably will be awarded soon. Sales of steel pipe are active, and the pending list totals from 4000 to 5000 tons, including 3000 tons for an oil line extension in western New York. Demand for wire mesh for road construction is exceptionally good.

Old Material.—Through an error in transmission, the quotations on No. 1 heavy melting steel appearing in the Aug. 15 issue of THE IRON AGE for the Buffalo district were $18.50 to $19. They should have been $17.50 to $18, and correction is accordingly made to that range. Scrap dealers are seeking material to ship on orders booked during the past two weeks, some of which were taken at $18 for No. 1 heavy melting steel, although a relatively small tonnage, it is stated, went at this price. Some dealers, however, are offering $17.75 for scrap to apply against such orders. Liberal purchasing of stove plate and No. 1 cast within the next week or two is indicated by inquiries which dealers have received for these grades. More liberal buying of machine shop turnings has advanced the price to $9. Good scrap is scarce in this district and dealers see strength in the present market situation.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$17.50 to $18.00
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	16.50 to 17.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.25 to 14.50
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	9.00
No. 1 railroad wrought	13.00 to 13.50
Acid Open-Hearth Grades:	
Knuckles and couplers	19.50 to 19.75
Coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades:	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades:	
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	10.50 to 11.00
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades:	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades:	
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.50 to 19.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Industrial	18.00 to 18.50
Railroad	18.00 to 18.50
Agricultural	18.00 to 18.50
Special Grades:	
Chemical borings	12.50 to 13.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Cincinnati

Pig Iron Sales Increase—Northern Prices Firm and Southern Are Weak—Scrap Market Strengthens

CINCINNATI, Aug. 20.—Pig iron sales of both Northern and Southern pig iron increased noticeably during the past week, as some district consumers entered the market to cover their needs for the remainder of this quarter and the early part of the fourth. The Indianapolis Castings Co., Indianapolis, took 1200 tons of Northern iron and the Anderson Stove Co., Anderson, Ind., bought 500 tons of the same grade. The reported prices on these and 1000 tons of miscellaneous orders figure back to about $18.50, base Lake furnace, allowing 25c. for silicon differentials. These orders reflect the continued firmness of the Northern market. A Valley furnace sold 2000 tons to an undisclosed buyer. Four sales of Southern iron also were reported. These were in quantities of 1000 tons, 400 tons, 250 tons and 200 tons and were the first sizable tonnages sold since the recent recession in Southern prices. Despite this renewal of interest in Southern iron, the market continues to be weak and, although quotations are being made on a $14.50 Birmingham base, reports of concessions down to $13.50 on tonnage orders have been heard. The only inquiry before the trade is from an Indiana consumer who is asking for 500 tons of malleable and 1000 tons of foundry iron.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	17.69 to 18.19
Ala. fdy., sil. 2.25 to 2.75	18.19 to 18.69
Tenn. fdy., sil. 1.75 to 2.25	17.69 to 18.19
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—Although the melt is reported to be heavy for August, specifications for by-product foundry coke slackened slightly during the past week, but they are still on a higher level than during the same period last year. Except for the sale of 8000 tons of by-product foundry coke to a Cincinnati consumer, new business is quiet.

Finished Material.—For the second week this month, bookings of sheets kept pace with production, causing the backlogs of nearby producers to remain virtually steady. A Cincinnati manufacturer of metal furniture has made tentative inquiry for 300 tons of sheets. In contrast to the strength of the sheet market, wire nails and wire goods, although fairly active in sales, are suffering because of uncertainty of prices. Wire nail business is being taken at $2.50 and $2.55 a keg, Pittsburgh.

Old Material.—Further strengthening of the district scrap iron and steel market was noticed during the past week, as dealers bid up heavy melting steel, scrap rails for melting and No. 2 railroad wrought 25c. a ton. Continued scarcity in these grades is making it difficult for dealers to keep covered while the quietness of the cast iron grades is causing yard stocks in this type of old materials to increase.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$14.25 to $14.75
Scrap rails for melting	14.25 to 14.75
Loose sheet clippings	9.00 to 9.50
Bundled sheets	11.00 to 11.50
Cast iron borings	9.25 to 9.75
Machine shop turnings	8.50 to 8.75
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.00 to 7.50
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	14.25 to 14.75
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.25 to 10.75
Stove plate	10.25 to 10.75
Brake shoes	10.25 to 10.75
Agricultural malleable	14.25 to 14.75
Railroad malleable	15.25 to 15.75

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex	3.85c.
Squares	4.35c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.	8.75
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Youngstown

Steel Output Decline Gradual and Small—Price Weakness Has Developed in Wide Strips

YOUNGSTOWN, Aug. 20.—Steel output in this district is declining gradually this month, although the total loss in output is not large. At least one important interest is admittedly maintaining its high operating rate in order to build up badly depleted stocks of finished steel. Valley steel mills are feeling the reduced operations of the automobile industry in some departments, but thus far the unusually high activity of the large steel consuming industries in the territory adjacent to Youngstown has offset lighter automobile steel requirements.

Prospects of a resumption in automobile buying next month are still good, but the heavier steel requirements expected at that time are not yet reflected to any large extent in steel company order books. However, sheet specifications are holding up fairly well and mills have large backlogs. The same may be said of cold-rolled strip, but tonnage releases on hot-rolled strip in both the narrow and wide sizes are disappointing. On the narrow widths, prices are being well maintained at 1.90c. and 2c., Pittsburgh, but severe price competition has developed on wide strips and mills must meet prices as low as 2.10c. and even 2c., Pittsburgh, on large business if they expect to share in it. This product is ordinarily sold on the same base as light blue annealed sheets, or 2.20c., Pittsburgh.

Sheet prices are about the same, with black sheets holding to 2.85c., Pittsburgh, on the general run of business. Galvanized sheets are being sold at 3.50c., but mills in this district refuse to go under 3.60c. except in unusual cases. Automobile body sheets seem to be holding at 4.10c., and the leading Valley maker is committed for several weeks. Metal furniture sheets are also in good demand, and have not experienced the decline in specifications which has occurred in the automobile material.

The pipe business in this district is better than it has been all year. Lap-weld mills are engaged at a comparatively high rate and the new electric welding pipe unit of the Republic Iron & Steel Co. is busy on recent large orders. Tin plate specifications are tapering off, but operations are still at about 85 per cent of capacity.

Steel ingot production of the leading makers averages from 90 to 95 per cent and sheet mills are still running at about 95 per cent. This rate will probably be maintained for at least another month on present business and thereafter will depend on automobile specifications.

The pig iron market is very quiet. No large transactions in basic iron have been reported in several weeks and sales of the foundry grade are confined to small lots. Shipments on contracts are not as heavy as they were last month, but steel foundry operations are good and iron is going to these users at an undiminished rate.

The scrap market has retained its recent strength and sales of heavy melting steel have been made at $19, delivered to Youngstown mills. Compressed sheets are not available at less than $18.50 and are not plentiful at that figure. Sales at higher prices are unconfirmed.

Automobile factories have entered the third week in August with production at a higher level than last month and well in excess of August of last year. Opinion that the August production will approximate 550,000 units is not uncommon in the industry at present, according to *Automotive Industries.*

Canada

Building Construction Is Still Active

TORONTO, ONT., Aug. 20.—Although the demand for merchant pig iron in the Canadian markets is gaining strength, new business is without feature. Sales for the week gained slightly over those of earlier weeks of the summer. Spot demand was responsible for all of the business of the week, with no forward delivery contracts reported. A steady demand prevails for foundry iron, with malleable moving in small tonnages. Prices are firm.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.60
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	24.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—Building activities are again taking on more life. Bridge construction projects are responsible for a growing demand for steel. Fabricating plants are operating at capacity. Several contracts in prospect range from 2000 to 8000 tons, and most of this business is expected to be closed within a couple of months. No let-up in building is in sight.

Old Material.—Some improvement developed in this market during the week. Business included a few substantial future delivery contracts. Local dealers report a steady demand for machinery cast. Prices are unchanged.

Dealers' buying prices:

	Toronto	Montreal
Per Gross Ton		
Heavy melting steel	$10.00	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	10.00	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	6.00	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
Per Net Ton		
No. 1 mach'ry cast	$16.00	....
Stove plate	12.00	....
Standard carwheels	15.00	....
Malleable scrap	14.00	....

To Increase Wire Plant at Hamilton, Ont.

In connection with the expansion program of the Steel Co. of Canada, Ltd., Hamilton, Ont., the latest development calls for the erection of a galvanized wire plant at Hamilton. In addition to galvanized wire, barbed wire and other fencing material will be produced.

The company also let a contract for an addition to its Montreal plant.

The new 10 and 12-in. mills at Hamilton came into production at the end of June. The new ore docks at Hamilton to be 3000 ft. long will probably be completed early next year.

Mossberg Company Expands

The Mossberg Pressed Steel Corporation, Attleboro, Mass., has completed a two-story addition to its plant, nearly doubling the floor area. It will now be possible to put all but one or two departments of the plant on daylight production.

The company is engaged in the production of pressed steel beams, beam heads and drop wires for the textile industry and makes specialties used by manufacturers of wire, both bare and insulated. New presses and machine tools have been installed, and in the welding department some of the latest type semi-automatic equipment for gas, arc and spot welding.

Plaster Poured Stone for Foundry Patterns

A stone mixture for making foundry patterns which can be turned, planed, drilled, filed or finished with emery paper is being introduced into this country from Germany, where it was developed by the Monolith Steinmodellplatten Gesellschaft, M. B. H., Dresden. The material, which is designated as Titanite, will be sold in the United States by the S. Obermayer Co., Pittsburgh. It is easily mixed as whitewash and when poured into a mold will harden in six to eight hours. When set, the material is extremely hard and makers claim that 40,000 molds may be made from one pattern plate. Should subsequent alterations be required, Titanite as required may be added, which will set as hard as the original pattern.

The mold for Titanite can be made from any good quality molding sand in the same way as for an iron or plaster of paris pattern. The stone mixture is made up in proportions of five parts of powder to three parts of the solution and thoroughly mixed to a thick paste. It should be poured slowly into one corner of mold and not moved about over the entire surface. The mixture is particularly adapted to use in mass production foundries where thousands of molds must be made from the same pattern and where wear and shrinkage of ordinary wood patterns run into considerable expense.

Melting Non-Ferrous Metals and Alloys in a Cupola

Melting and refining non-ferrous metals in direct contact with a special carbon fuel in a cupola type of furnace is a new departure. This process has been developed by the Barrett Co., 40 Rector Street, New York. According to the company, the process is of particular value for the melting and casting of red brass or bronze, high lead-bearing alloys and casting copper.

Metal charges of 500 to 600 lb. are charged directly on top of an incandescent bed of what is known as "fixed carbon fuel," a product of the company, and are ready to be tapped into the pouring ladles in 11 to 16 min. The charges may consist of all chips (borings and turnings), of all ingots, or of mixed heats of chips, gates, scrap and ingots.

Pouring temperatures are regulated by air control and the depth of the bed of fuel, and a metal-pouring temperature of 2500 deg. Fahr. is claimed to be secured without any difficulty. Features of the new process are pointed out as follows:

High grade of metal secured at the tap hole, thereby reducing the number of rejections in the foundry and machine shop.

Low total cost of melting per ton and per metal charges, due to a high metal-to-fuel ratio.

High-speed melting.

High metal recovery.

Ability to use more foundry scrap, chips, etc., and less composition ingots without affecting the quality of the castings.

Low cost of furnace maintenance and upkeep.

Freedom in the foundry from heat, fumes, gases and noise.

Extreme flexibility of process and furnace.

Simplicity of operation.

Economy of floor space.

Production and Shipment of Raw Materials and Finished Products

	July, 1929	June, 1929	July, 1928
Electric industrial trucks and tractors (a)	169	201	107
Do., shipments, 7 months	1,272	....	833
Mechanical stokers sold (a)	186	203	....
Do., hp. rating	65,197	67,322	....
Bituminous coal (b), net tons	40,619,000	38,073,000	36,276,000
Anthracite (b), net tons	4,987,000	5,069,000	4,394,000
Beehive coke made (b), net tons	600,800	602,400	280,000
Portland cement made (b), bbl.	17,216,009	16,775,000	17,474,000
Do., shipped (b), bbl.	20,273,000	18,942,000	19,901,000
	June, 1929	May, 1929	June, 1928
Electric power (c), thousands kwhr.	7,768,790	8,083,400	(d) 7,000,000
Do., by water-power (c)	3,071,756	3,482,431	....

(a) Department of Commerce.
(b) United States Bureau of Mines.
(c) United States Geological Survey.
(d) Approximate.

Non-Ferrous Metal Markets

Fair Demand for Copper and Tin—Lead and Zinc Quiet —All Prices Firm

NEW YORK, Aug. 20.

Copper.—Despite the announcement, early last week, of July statistics which were favorable to sellers and which it was thought might stimulate buying, the market has remained quiet. Buying by foreign consumers has continued at about the same pace as in the previous three weeks, and there have been fairly good purchases by domestic consumers. Demand from these has not increased, partly because they feel assured that the price will not advance and partly because they learned a lesson when they bid the market up on themselves last March. Orders on the books of consumers are satisfactory and are being augmented each week. Taken as a whole, the market is in a satisfactory condition and prices are stable. There has been no price change since the middle of April. Electrolytic copper is selling at 18c. a lb., delivered in the Connecticut Valley, and the quotation of Copper Exporters, Inc., is officially unchanged at 18.30c., delivered c.i.f. European ports. The Lake copper market is fairly active and firm at 18.12½c. delivered.

Tin.—This market could hardly be more featureless. For the week ended with Saturday, Aug. 17, sales of Straits tin were about 1000 tons. Large consumers, who usually buy far ahead, are uninterested. The only business is for spot and early delivery by such users as are accustomed to buy only for nearby positions. Their orders range from 5 to 20 tons each. The stability of prices, which has been prominent so long, continues. Fluctuations in the week have been only about ½c. a lb. The same steadiness prevails in the London market, where business also is in small volume. Spot Straits tin was quoted today at 46.75c. a lb., New York, as compared with 46.37½c. a week ago. In London today quotations were nearly £2 per ton higher than a week ago, with spot standard quoted at £209 17s. 6d., future standard at £213 15s. and spot Straits at £213 12s. 6d. The Singapore quotation today was £218 10s. Large consumers in this market are well covered ahead because, when prices were down to 45c. to 46c. a lb., they entered the market on a large scale.

Lead.—Demand is confined almost entirely to August delivery and in

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Aug. 20	Aug. 19	Aug. 17	Aug. 16	Aug. 15	Aug. 14
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	46.50	46.87½	....	46.62½	46.50	46.50
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	6.55	6.55	6.55	6.55	6.55	6.55
Lead, New York	6.75	6.75	6.75	6.75	6.75	6.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
Tubes, base ..... 42.00c.
Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	11.35c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	48.00c. to 49.00c.
Tin, bar	50.50c. to 51.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.75c. to 8.25c.
Lead, American pig	7.50c. to 8.00c.
Lead, bar	9.50c. to 10.00c.
Antimony, Asiatic	10.50c. to 11.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy	24.00c. to 25.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	30.25c. to 31.25c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig	51.63c.
Tin, bar	53.63c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	7.75c. to 8.00c.
Lead, American pig	7.25c. to 7.50c.
Lead, bar	9.75c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade	18.75c.
Babbitt metal, high grade	56.00c.
Solder, ½ and ½	31.75c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.25c.
Copper, hvy. and wire	14.50c.	15.75c.
Copper, light and bottoms	12.50c.	13.75c.
Brass, heavy	8.50c.	9.50c.
Brass, light	7.50c.	8.50c.
Hvy. machine composition	12.00c.	13.00c.
No. 1 yel. brass turnings	9.75c.	10.50c.
No. 1 red brass or compos. turnings	11.25c.	12.25c.
Lead, heavy	5.25c.	5.75c.
Lead, tea	4.25c.	5.25c.
Zinc	3.50c.	4.25c.
Sheet aluminum	14.00c.	16.00c.
Cast aluminum	12.25c.	14.25c.

the last day or two sales have been good. There has been little buying by consumers for September, but this will probably develop soon. One large Middle Western producer has sold its August output. Prices continue firm at 6.55c., St. Louis, which has prevailed for some time. The leading interest continues to quote 6.75c., New York, as its contract price.

Zinc.—Demand continues in light volume and is made up principally of small lots for early shipment. Conditions which have prevailed for a week or two continue. Consumers are buying only from hand-to-mouth, but it is believed by some that they are not covered ahead and that purchases on a larger scale must soon appear. Despite this, quotations are firm at 6.80c. a lb., East St. Louis, or 7.15c., New York. On small lots this can possibly be shaded to 6.75c., East St. Louis. The price of ore continues at $44 a ton, Joplin. Production for the week ended Aug. 17 is estimated at 13,700 tons. Sales were again large at about 11,500 tons and shipments were about 12,465 tons. Surplus stocks now stand at about 46,300 tons.

Antimony.—Because an increase in the duty is proposed in the new tariff bill as it comes from the Senate, the market is more active and prices are a little higher. Chinese metal is quoted and sold today at 9c. per lb., New York, duty paid, for spot and nearby delivery with futures at 8.87½c.

Nickel.—In wholesale lots, ingot nickel is quoted at 35c. per lb., shot nickel at 36c. and cathode electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at 23.90c. per lb. delivered, according to published quotations.

Non-Ferrous Metals at Chicago

CHICAGO, Aug. 20.—All of the metals are stronger and antimony has advanced to 9.85c. a lb. Tin is the most active metal. The old metals are quiet, with prices unchanged.

Prices per lb., in carload lots: Lake copper, 18.50c.; tin, 47.62½c.; lead, 6.70c.; zinc, 6.87½c.; in less-than-carload lots, antimony, 9.85c. On old metals we quote copper wire, crucible shapes and copper clips, 14c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.25c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Railroad Equipment

North American Car Co. and Reading Buy Cars

RAILROADS ordered more than 750 cars the past week. The North American Car Co. bought 500 tank cars and the Reading purchased 200 gondolas. The market is almost devoid of new inquiries, although considerable business is pending. Details of the week's business follow:

Reading has ordered 200 70-ton gondolas from Bethlehem Steel Corporation.

Elgin, Joliet & Eastern has bought 25 air-dump cars from Magor Car Corporation and 25 from Differential Steel Car Co.

Chicago Great Western has ordered two caboose cars from Mount Vernon Car Mfg. Co.

North American Car Co. has purchased 500 8000-gal. tank cars from Pressed Steel Car Co.

Chicago & Alton has ordered two 60-ft. postal cars, two 70-ft. combination passenger and baggage cars and one 70-ft. baggage and mail car from Pullman Car & Mfg. Corporation.

Consolidated Railroads of Cuba have ordered four combination passenger and baggage gasoline rail motor cars from J. G. Brill Co.

Argentine State Railways is inquiring for two or three Garrett-type locomotives.

Central of Georgia is inquiring for 50 flat cars.

Great Northern has ordered 300 flat cars from Standard Steel Car Co.

Reinforcing Steel

Awards, Totaling 10,600 Tons, Were Largest Since May

AWARDS, totaling over 10,600 tons, were the largest since the middle of May. Three thousand tons of bars were for a bridge at Harrisburg, Pa., 2100 tons for a boulevard at Pittsburgh and 800 tons for an automobile assembly plant at Tarrytown, N. Y. The only inquiry of the week was 1000 tons for a reservoir and filtration plant at Youngstown. Awards follow:

BROOKLINE, MASS., 150 tons, bridge, to Concrete Steel Co.

TARRYTOWN, N. Y., 800 tons, assembly plant for Chevrolet Motor Co., to Kalman Steel Co.

NEW YORK, 121 tons, pier 3, North River, to Concrete Steel Co.

SAYERVILLE, N. J., 400 tons, building for East New Jersey Power & Light Co., to Concrete Steel Co.

HARRISBURG, PA., 3000 tons, soldiers' and sailors' memorial bridge, to Taylor-Davis Co.

BLOOMSBURG, PA., 100 tons, building for Magee Carpet Co., to Danville Structural Steel Co.

GREENVILLE, PA., 100 tons, sewage disposal plant, to Electric Welding Co.

PITTSBURGH, 2100 tons, Ohio River boulevard, to McClintic-Marshall Co.

CLEVELAND, 150 tons, highway work for Speedway Construction Co., to Pattison-Leitch Co.

CHICAGO, 700 tons, warehouse for Walgreen Drug Co., to Inland Steel Co.

ELKHART, IND., 285 tons, county line bridge, to Concrete Engineering Co.

CHICAGO, 150 tons, Henrici restaurant building, to Olney J. Dean & Co.

RACINE, WIS., 100 tons, apartment building, to Calumet Steel Co.

CHICAGO, 100 tons, Barco Mfg. Co. plant, to Concrete Steel Co.

CHICAGO, 400 tons, Wilbur Wright public school, to unstated bidder.

PEORIA, ILL., 1600 tons, filtration plant, to Laclede Steel Co.

OLYMPIA, WASH., 100 tons, Tacoma Avenue highway, to Northwest Steel Rolling Mills.

TACOMA, WASH., 154 tons, Lake Cushman project, to unnamed interest.

LOS ANGELES, 100 tons, apartment on Formosa Avenue, to unnamed interest.

SAN JOSE, CAL., 100 tons, bridge over Uvas Creek, to W. S. Wetenhall Co.

Reinforcing Bars Pending

YOUNGSTOWN, OHIO, 1000 tons, reservoir and filtration plant.

Foundry Equipment Orders Highest in Eleven Months

Orders for foundry equipment in July, reported by members of the Foundry Equipment Manufacturers Association, were the largest for any month this year and the largest since last August. Shipments were heavier than for June and a marked increase was recorded in the amount of unfilled orders.

Taking the average monthly shipments for 1922, 1923 and 1924 as 100, July's orders were 219.3, against 177.3 in June and 183.9 for the 12 months preceding July.

Shipments in July were 182.1, against 172.7 in June, 124.8 in July, 1928, and 196.8 for the 12 months preceding July.

The unfilled order index rose from 300.8 in June to 368.7. A year ago it stood at 332.1.

Navy Calls for Bids on Steel and Machinery

The Bureau of Supplies and Accounts, Navy Department, will open bids on Sept. 3 for two precision horizontal boring, drilling and milling machines for the Washington Navy Yard to be used in the manufacture of guns for new cruisers. The bureau will receive bids on Sept. 3 for 200 metallic-ladder treads for use at the Brooklyn yard.

On Aug. 27 it will receive bids for 500 tons of medium black steel plates and 400 tons of shapes for delivery at the Philadelphia yard to be used in the modernization of the battleship Pennsylvania. On the same date the bureau will also receive bids for about 150 tons of plates and 140 tons of shapes for the Washington yard to be used in cruiser construction.

Adopts Five-Day Week

MILWAUKEE, WIS., Aug. 19.—The first important industry in Milwaukee to adopt the five-day working week plan is the Moe-Bridges Co., manufacturer of electric lighting specialties that are sold nationally. The company's force includes 325 employees, who will continue to put in 45 hr. weekly, as heretofore, by working 9 hr. a day instead of 8, giving them a Saturday as well as Sunday holiday. The plan is the result of a suggestion emanating from the employees themselves, according to C. A. Bridges, president, who adds that 60 per cent of them are skilled workers and 40 per cent are stockholders. Wages and salaries will be in no way affected by the change.

PERSONAL

F. C. HOSIMER has been transferred from the home office of the Wagner Electric Corporation, St. Louis, to the Chicago branch sales office.

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GEORGE E. LEARNARD has been elected chairman of the board of the International Combustion Tar & Chemical Corporation, New York, succeeding F. J. LEWIS, who has resigned because of the pressure of other business activities, but who will continue as a director. WALTER RUNGE has been made president, succeeding W. H. LEWIS, who has also resigned and who will be associated with the corporation in an advisory capacity. GRANT THORN has been elected vice-president in charge of sales.

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FRED A. CONKLE, formerly associated with the New England Road Machinery Co., Boston, has been appointed railroad representative for the sale of lift-trucks, stackers and skid-platforms by the Lewis-Shepard Co., Boston.

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WALTER M. MCFARLAND, manager of the marine department, Babcock & Wilcox Co., New York, and C. R. BURT, general manager, Pratt & Whitney Co., Hartford, Conn., have been appointed to represent the American Institute of Weights and Measures at the fiftieth anniversary celebration of the American Society of Mechanical Engineers next year.

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FRANK D. BREBNER, for many years in charge of the Newcastle, Ind., plant of the Chrysler Corporation, has been transferred to the staff of K. T. KELLER, vice-president in charge of manufacturing, Detroit. The direction of the Newcastle plant will be under E. S. CHAPMAN, who goes there from the manfacturing division of the Detroit office.

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OLAF ISACHSEN, sales manager of the Strand & Sweet Mfg. Co., Winsted, Conn., has resigned to associate himself with the Wheeler Wire Co., Bridgeport, Conn.

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JOHN R. JEFFERY, manager of the electrical department of the Allis-Chalmers Mfg. Co., Milwaukee, is retiring after completing 28 years of service with the company and one of its predecessors, the Bullock Electric Mfg. Co., Cincinnati. His assistant, R. S. FLESHIEM, has been appointed to succeed him, and L. W. GROTHAUS, also an assistant manager, has been transferred from the Bullock works, Norwood, Ohio, to Milwaukee to take Mr. Fleshiem's place.

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E. L. CORD, head of the Auburn Automobile Co., has acquired an interest in the Columbia Axle Co., Cleveland, and in the reorganization to be effected will become chairman of the board. EDWIN H. PARKHURST, formerly vice-president and general manager, will become president. W. R. HOPKINS and BEN F. HOPKINS, Cleveland, who controlled the company and were president and secretary-treasurer respectively, will retire from the board but will retain a substantial interest. R. E. FRIES and F. H. RAGAN will be vice-presidents in charge of sales and factory, respectively.

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M. A. GROSSMAN, chief research metallurgist of the Central Alloy Steel Corporation, Massillon, Ohio, has sailed for Europe to continue his study of the special European steels which the company is preparing to produce in this country.

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JOHN H. LAWRENCE, vice-president and manager of Thomas E. Murray, Inc., New York, since its organization, has been elected president. After graduation from Cornell University, he was employed in the engineering department of the New York Edison Co. In 1919 the late THOMAS E. MURRAY, to consolidate the various consulting engineering activities he had engaged in for many years, formed the company which bears his name, and selected Mr. Lawrence as active head in charge. Many of the largest power stations in the country have been designed by the company, including the Hell Gate Station, New York.

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PAUL D. MERICA has been appointed technical assistant to the president of the International Nickel Co., Inc., New York. Formerly he was assistant manager of that company's development and research department.

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E. J. SCHWANHAUSSER, for the past two years assistant manager of the Harrison, N. J., works of the Worthington Pump & Machinery Co., has been appointed manager of the Buffalo works of the company.

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FRED M. CROSS, manager of the Chicago pneumatic tool sales department of the Ingersoll-Rand Co., New York, has been made assistant general manager of pneumatic tool sales and will be located in the New York office. D. W. ZIMMERMAN takes his place in Chicago.

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AUGUST HERMAN TUECHTER, president, Cincinnati Bickford Tool Co., Cincinnati, was the recipient of the felicitations of some 400 employees of the company on the occasion of his sixtieth birthday, Aug. 15.

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J. F. LINCOLN, president Lincoln Electric Co., Cleveland, sailed on the Leviathan for London, where he will take charge of a demonstration for European engineers of the Electronic Tornado process of carbon arc welding. The demonstration will take place at the Allen Liversidge plant.

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E. I. EVANS has been appointed open-hearth superintendent of the Bourne-Fuller Co., Cleveland. He was formerly associated with the Worth Steel Co., Claymont, Del., having been open-hearth superintendent of that company for 11 years.

Koppers Interests to Own Mystic Iron Works

Koppers interests of Pittsburgh, through the recent organization of a holding company called Eastern Gas & Fuel Associates, will gain control of the Massachusetts Gas Companies, a New England public utility organization which owns the New England Coal & Coke Co. and the Mystic Iron Works, the latter the only producer of pig iron in New England.

Eastern Gas & Fuel Associates is offering to exchange its shares for securities of the Massachusetts Gas Companies. Stockholders in the former company will also share in the earnings of the Connecticut Coke Co., New Haven, Conn., and the Philadelphia Coke Co., Koppers interests.

H. B. Rust, who is president of the Koppers Co., Pittsburgh, has been elected chairman of Eastern Gas & Fuel Associates, while W. F. Rust, vice-president of the Koppers Co., is president of the new organization. Other officers are: Vice-presidents, H. Lee and Donald Mac Arthur; treasurer, S. T. Brown; secretary, E. H. Bird; assistant secretaries, John D. Shaner and David M. Gilmore. All of these officers hold similar positions with the Koppers Co.

James L. Richards, president, Massachusetts Gas Companies, and Frederick E. Snow, a member of the executive committee of Massachusetts Gas, are members of the executive committee of Eastern Fuel & Gas Associates, together with W. F. Rust, H. Lee, Donald Mac Arthur and Hugh F. Smith.

The Machine Tool Show

The National Machine Tool Builders' Association for the Machine Tool Show to be held in the Cleveland Public Auditorium, Sept. 30 to Oct. 4, inclusive, is planning to handle an increase in registrants of 50 per cent over the attendance at the first Machine Tool Show, held in the same Cleveland buildings in September, 1927.

The area of this year's show will exceed by 25 per cent that of the 1927 show. Some 5000 hp., it is announced, will be required to carry the maximum load for the machinery that will be in operation.

Nearly 250 separate displays will be presented, occupying areas ranging from 3000 sq. ft. down.

Fabricated Structural Steel

Awards of 51,000 Tons Were Largest Since Last Week of June—Inquiries Total 32,000 Tons

STRUCTURAL steel awards of 51,000 tons were the largest since the last week of June. About one-third of the tonnage will go into bridges. However, lettings were from widely diversified sources, a considerable percentage of the bookings having been designated for industrial work and for railroad projects. Structures for non-industrial purposes again were of minor importance. Outstanding contracts were 8100 tons for a New York subway section and 7000 tons each for a Newark, N. J., bank building and for a bridge across the Maumee River at Toledo.

Fresh inquiries were 32,000 tons, as against 42,000 tons during the previous week. Fifty-eight hundred tons is for a Brooklyn hospital and 4850 tons for bridges for the Great Northern Railroad. Awards follow:

STATE OF NEW YORK, 500 tons, highway bridge, to American Bridge Co.

NEW YORK, 8100 tons, route 107, section 6, of subway, to McClintic-Marshall Co.

NEW YORK, 2000 tons, apartment building at Ninetieth Street and Park Avenue, to Harris Structural Steel Co.

PENNSYLVANIA RAILROAD, 10,000 tons, passenger bridge across Hackensack River, to Bethlehem Steel Corporation; erroneously reported to American Bridge Co.

NEWARK, N. J., 7000 tons, National Newark & Essex Banking Co. building, to Hay Foundry & Iron Works.

ROCHESTER, N. Y., 3500 tons, Smith Street bridge, to Phoenix Bridge Co.

ATLANTA, GA., 400 tons, union passenger depot, to Virginia Bridge & Iron Co.

GREENSBORO, N. C., 440 tons, S. H. Kress Co. store, to Ingalls Iron Works Co.

BIRMINGHAM, ALA., 325 tons, sheds at terminal station, to Virginia Bridge & Iron Co.

BIRMINGHAM, ALA., 180 tons, plant for Lamson & Sessions Bolt Co., to Virginia Bridge & Iron Co.

CLEVELAND, 600 tons, grade elimination bridge for Cleveland Interurban Railway Co., to Bethlehem Steel Co.

LANSING, MICH., 1600 tons, municipal power house, to Whitehead & Kales Co.

TOLEDO, 7000 tons, suspension bridge over Maumee River; McClintic-Marshall Co., low bidder.

ROCK ISLAND, ILL., 1900 tons, wheel house and dock covering for International Harvester Co., to Lakeside Bridge & Steel Co.

FORT WAYNE, IND., 1700 tons, Lincoln National Bank building, to McClintic-Marshall Co.

CHICAGO, 400 tons, addition to building C-6, Corwith plant, Crane Co., to American Bridge Co.

LOCKPORT, ILL., 200 tons, township high school, to Mississippi Valley Structural Steel Co.

ST. LOUIS, 5800 tons, Illinois Terminal Co., bridge approach, to McClintic-Marshall Co.

CHICAGO, 1100 tons, factory addition for Edison Electric Appliance Co., to McClintic-Marshall Co.

ROCKFORD, ILL., 500 tons, plant for Rockford Drop Forge Co., to Wisconsin Bridge & Iron Co.

PERU, ILL., 300 tons, building for Western Clock Co., to Mississippi Valley Structural Steel Co.

OKLAHOMA CITY, OKLA., 2700 tons, Pittsburgh Plate Glass Co. plant, to Muskogee Iron Works.

KANSAS CITY, MO., 450 tons, railroad viaduct, to Kansas City Structural Steel Co.

CHEYENNE, WYO., 200 tons, hangar for Boeing Air Transport, Inc., to Judson-Pacific Co.

ALHAMBRA, CAL., 100 tons, Elks Club, to Pacific Iron & Steel Co.

SAN FRANCISCO, 100 tons, apartment building at Forty-fifth Avenue and Point Lobos, to Judson-Pacific Co.

SAN FRANCISCO, 300 tons, Sommer-Kaufmann store on Market Street, to Western Iron Works.

OAKLAND, CAL., 400 tons, factory for Hazel-Atlas Glass Co., to Judson-Pacific Co.

VALLEJO, CAL., 100 tons, Memorial building, to Judson-Pacific Co.

TACOMA, WASH., 1928 tons of plates, penstock for Lake Cushman project, to Western Pipe & Steel Co.

WEST VANCOUVER, B. C., 600 tons, Capilano bridge, to Western Canadian Structural Steel & Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

MONTREAL, QUE., 3000 tons, university buildings.

MONTREAL, QUE., 1000 tons, Young Men's Christian Association building.

BOSTON, 1000 tons, canopies for South Station.

PITTSFIELD, MASS., 385 tons, Longfellow Inn.

HARTFORD, CONN., 235 tons, First National Stores warehouse.

BROOKLYN, 5800 tons, Kings County hospital.

PHILADELPHIA & READING RAILROAD, 400 tons, bridge across Schuylkill River.

CLEVELAND, 150 tons, service building for White Motor Co.

MILWAUKEE, 2000 tons, office building for the Milwaukee Electric Railway & Light Co.

GREAT NORTHERN RAILWAY, 4850 tons, bridges.

MINNEAPOLIS, 2000 tons, Foshey Building.

DECOTO, CAL., 350 tons, administration building for Masonic Home.

EVERETT, WASH., 10,000 tons plates, pipe line.

German Truck Exports Increasing

HAMBURG, GERMANY, Aug. 10.—A good export trade has been developed by the Bussingwerke A. G., one of the leading German makers of large buses and trucks, specializing in capacities from 5 to 10 tons. The company recently received a large order from the Turkish Government and Russia has purchased more than 400 buses and heavy trucks from the Bussingwerke in the past two years and has just ordered 40 more. Spain and Portugal are also active customers. Despite the downward revision of the German tariff on motor cars this company has been able to meet foreign competition in the domestic market. In 1925 German imports of buses and trucks exceeded exports by 200 per cent, but in 1928 exports were seven times the imports.

July British Iron and Steel Output Heavy

LONDON, ENGLAND, Aug. 16 (*By Cable*).—Production of pig iron in July was 671,900 gross tons and that of steel ingots and castings was 803,800 tons. The July pig iron output was the largest this year. That for steel was the fifth largest, with the peak at 859,900 tons in March.

Comparisons of present output with other years is as follows:

	Pig Iron, Gross Tons	Steel Ingots and Castings, Gross Tons
1913—Av. monthly..	855,000	638,600
1920—Av. monthly..	669,500	755,600
1922—Av. monthly..	408,500	490,100
1923—Av. monthly..	620,000	706,800
1924—Av. monthly..	609,900	685,100
1925—Av. monthly..	519,700	616,400
1926—Av. monthly..	203,500	296,700
1927—Av. monthly..	607,800	758,200
1928—Av. monthly..	550,900	710,400
1929—Av. first quar..	558,000	801,400
1929—April	611,300	808,600
1929—May	654,800	840,400
1929—June	657,800	839,900
1929—July	671,900	803,800

The July output of pig iron compares with a monthly average of 599,600 tons for the first half. The steel production last month compares with 814,000 tons per month for the first half.

Obituary

ALFRED HUTCHINSON COWLES, inventor of the process whereby aluminum in commercial quantities could be produced, died at his home in Sewaren, N. J., Aug. 13, aged 70 years. He was born in Cleveland and was educated at Ohio State and Cornell universities. His interest in electrochemistry led to experiments with the electric furnace, especially in the production of aluminum and aluminum alloys. After many months of research with his brother, Edwin H. Cowles, the Cowles Electric Smelting & Aluminum Co. was formed, which completed an electric smelting plant in Lockport, N. Y., in 1885. At the time of his death he was president of the Electric Smelting & Aluminum Co., Lockport, N. Y.

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JOHN DAVID HURLEY, president, Independent Pneumatic Tool Co., Chicago, died of a heart attack in his rooms at the Edgewater Beach Hotel, Chicago, aged 74 years.

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W. CHARLES LIPE, president, W. C. Lipe, Inc., Syracuse, N. Y., mechanical engineering and machine specialties company, is believed to have lost his life in a boat collision on the St. Lawrence at Alexandria Bay, N. Y., on Aug. 16.

Machinery Markets and News of the Works

Tool Sales Have Declined

International Harvester Co. and Western Electric Co. Have Been Large Buyers

A FURTHER seasonal drop in machine tool sales occurred the past week. However, manufacturers and dealers report that business still is sustained far above the level normally reached in midsummer.

The placing of orders for a tractor plant of the International Harvester Co. at Rock Island, Ill., calling for a total expenditure of close to $500,000, has featured the market at Chicago. It is interesting to note that purchases of tools for tractor makers have accounted for from 25 to 60 per cent of dealers' total sales in the Chicago district this year.

Another important source of business has been the Western Electric Co. and a wide range of shops to which it has been compelled to farm out its work on talking motion picture equipment. The Cleveland Union Terminals Co., Cleveland, has completed the buying of a list of 25 tools for locomotive repair shops. The Westinghouse Electric & Mfg. Co., East Pittsburgh, has bought a number of items, but still has to contract for a large part of its third quarter requirements.

The Curtiss-Caproni Corporation, New York, which will equip a new plant at Baltimore for the manufacture of airplanes, has ordered tools against a list issued about two months ago.

Despite the falling off in business, the delivery situation has not been substantially bettered. One large machine tool builder cannot make shipments in less than eight months and another is refusing orders unless customers are willing to wait a year. While these are exceptional cases, it is not unusual to find dealers and manufacturers quoting from three to six months' deliveries on various types of machines.

Machine tool orders fell off somewhat sharply in July as compared with those of June, states the National Machine Tool Builders' Association. The association points out that in other years the seasonal decline has lasted from May to August and that perhaps for the very reason that the recession was postponed for two months this year, the July volume was lower than it might have been. According to the association's index, actual orders in July were 27 per cent higher than in July, 1928, and the three months' average showed a 40 per cent gain.

Says the association: "In the face of the high level of shipments, and the good backlog of unfilled orders, the letting down in orders must be regarded as beneficial to the industry rather than as an alarming sign. If the month of August makes no better showing than July, there would still be no cause for apprehension for the future. Normally, however, July is the poorest of the summer months."

New York

NEW YORK, Aug. 20.—Machine tool business is holding at a remarkably high rate for midsummer. Some local sales offices report a slight decline in bookings, but others are doing a volume of business that compares favorably with the best previous months of the year. One large distributer reports sales in the first half of August equaling those of the first half of July, and the latter month was one of the best of the year for this company. The demand for radial drills is a feature of the current situation. One company last week received orders for 11 radial drills in one day from nine different buyers. The Curtiss-Caproni Corporation, New York, which will equip a new plant in Baltimore for the manufacture of airplanes has placed a large number of orders against a list issued about two months ago.

Contract has been let by Eberhard Faber, Inc., 37 Greenpoint Avenue, Brooklyn, manufacturer of hard rubber goods, etc., to C. C. Woodruff, 213 Tenth Avenue, Long Island City, for five-story addition on Java Street, reported to cost about $65,000 with equipment. F. H. Klie, 250 Park Avenue, New York, is architect.

Rainbow Metal Units Corporation, 125 Harris Avenue, Long Island City, manufacturer of steel shelving, etc., has leased factory at 330 William Street for new plant. It is understood that present plant will be removed to new location and capacity increased for other pressed steel specialties.

General Gas & Electric Corporation, 50 Pine Street, New York, operating electric light and power properties in northern New York, New Jersey, South Carolina and other States, has arranged for increase in capital from 4,000,000 to 4,400,000 shares of stock, no par value, portion of proceeds to be used for expansion. Company has large hydroelectric power project under way on Saluda River in last-noted State, estimated to cost more than $15,000,000.

Department of Mental Hygiene, Capitol Building, Albany, N. Y., will receive bids until Aug. 28 for steel standpipe and elevated tank at Wassaic State School for Mental Defectives, Amenia, N. Y., 1,000,000 gal. and 300,000 gal. capacity respectively. Plans at office of Department of Public Works, Division of Engineering, 353 Broadway, Albany.

Victor C. Farrar, 1 Park Avenue, New York, architect, has filed plans for a one-story machine shop at 518 West Thirty-seventh Street, to cost about $20,000.

Pilot Radio & Tube Corporation, Brooklyn, has concluded arrangements for purchase of Twin Coupler Co., Inc., Poughkeepsie, N. Y., manufacturer of radio frequency coils and kindred products, and will consolidate with organization.

Continental Can Co., 1 Pershing Square, New York, has acquired five acres of land adjoining present plant in Clearing industrial district, Chicago, and has approved plans for new additions, including tin plate mill, sheet coating mill, lacquering plant, can-manufacturing unit, and storage and distributing plant, reported to cost about $1,000,000 with equipment. Work will be carried out in connection with $5,000,000 expansion fund arranged for this year. Company has concluded arrangements for purchase of plant and business of Gille Mfg. Co., Kansas City, Mo., manufacturer tin containers for food products, etc., and will consolidate with organization. Plant will be maintained at present location and operated as individual unit.

Seelig & Finkelstein, 66 Court Street, Brooklyn, architects, have plans for a two-story automobile service, repair and garage building at Raymond and Bolivar Streets, estimated to cost $100,000 with equipment.

Cable Radio Tube Corporation, 80 North Ninth Street, Brooklyn, is carrying out an expansion and improvement program, including installation of additional equipment for larger output. Negotiations

are said to be under way for the acquisition of two new plants to be operated in conjunction with present factory.

United Aircraft & Transport Co., operating Chance Vought Aircraft Corporation, Long Island City, and other similar interests, has acquired Avian Corporation, Los Angeles, manufacturer of all-metal aircraft of special type, and has organized new subsidiary under name of Northrop Aviation Corporation to take over and operate Avian interest. Plans are under consideration for new plant for Northrop organization at Burbank Field, Los Angeles, exclusively for Avian type aircraft, reported to cost more than $75,000 with equipment.

Bakelite Corporation, 247 Park Avenue, New York, manufacturer of insulating products, composition rubber goods, etc., has acquired land at Bound Brook, N. J., and plans new plant, on which work will be started in fall. It will cost more than $300,000 with equipment.

Jersey Central Power & Light Co., 20 South Street, Asbury Park, N. J., has awarded general contract to Deakman-Wells Co., 921 Bergen Avenue, Jersey City, N. J., for steam-operated electric generating plant on waterfront at South Amboy, N. J., for which foundations are under way, main unit, one story, 160 x 160 ft., to be equipped for initial output of 50,000 kw., reported to cost close to $4,500,000 with transmission system. Electric Managament & Engineering Corporation, 57 William Street, New York, is engineer, in charge.

Pennsylvania Railroad Co. is having plans drawn for an eight-story cold storage and refrigerating plant, 230 x 900 ft., on waterfront near Exchange Place, Jersey City, N. J., reported to cost close to $1,000,000 with equipment. George F. Bial, 147 Summit Avenue, Union City, N. J., is architect.

Tung-Sol Lamp Works, Inc., 95 Eighth Avenue, Newark, manufacturer of radio tubes and equipment, is said to be planning immediate call for bids for a four-story addition at High Street and Seventh Avenue, to cost approximately $200,000 with equipment. Portion of new unit will be used for manufacture of miniature electric lamps; company has acquired machinery and equipment of Neptron Corporation, a subsidiary of Hygrade Lamp Co., Salem, Mass., and will remove to new plant unit as soon as available. A new subsidiary has been formed under name of Brown & Caine, Inc., to maintain a plant at Chicago for manufacture of radio and automotive equipment. Fougner & Gautier, 103 Park Avenue, New York, are architects for new Newark factory.

Detroit

DETROIT, Aug. 20.—Grand Trunk Railroad Co., 400 East Jefferson Street, Detroit, has taken bids on new car and locomotive terminal repair shops at Pontiac, Mich., reported to cost over $85,000 with equipment.

Calumet Township Board of Education, Calumet, Mich., is considering installation of manual training equipment in new three-story high and grade school at Calumet and School Streets, estimated to cost $300,000, for which plans have been drawn by J. D. Chubb, 109 North Dearborn Street, Chicago, architect.

Clark Equipment Co., Buchanan, Mich., manufacturer of transmissions, axles, wheels, etc., has awarded general contract to Frank L. Shoemaker Construction Co., East Congress Street, Sturgis, Mich., for one-story plant at Berrien Springs, Mich., 130 x 200 ft., to cost close to $90,000 with equipment.

Scott Engineering Co., Plainwell, Mich., recently organized with capital of $50,000, has taken over local factory of Aluminum Products Co., for production of aircraft engines and parts.

Officials of Continental Motors Corporation, East Jefferson Avenue, Detroit have organized a subsidiary under name of Continental Aircraft Engine Co., with capital of 250,000 shares of stock, no par value, to operate a plant for manufacture of aircraft engines, including parts and assembling departments. R. W. Judson is president of both companies.

John Bean Mfg. Co., 735 Hazel Street, Lansing, Mich., manufacturer of mechanical equipment, has plans for a one and two-story addition to machine shop, reported to cost about $40,000 with equipment. J. N. Churchill, Prudden Building, is architect. H. C. Lisle is manager.

Bay City Shovels, Inc., Bay City, Mich., formerly Bay City Dredge Works, Inc., is completing a new one-story addition, totaling about 18,000 sq. ft. floor space, and will occupy for expansion in assembling division. Cost will be $50,000 with equipment.

Muskegon Motor Specialties Co., Muskegon, Mich., manufacturer of automotive parts and equipment, has awarded general contract to Strom Construction Co., Muskegon, for one-story addition, to cost more than $50,000 with equipment. Company has plans under way for another unit, one story, to be equipped as a heat-treating plant, to cost $30,000 with equipment. Fred L. Flanders is chairman of board.

Board of Education, Village of East Detroit, is said to be planning installation of manual training equipment in three-story junior high school addition, reported to cost more than $250,000, for which bids have been asked on general contract. Warren S. Holmes Co., Capitol Savings & Loan Building, Lansing, Mich., is architect.

Buffalo

BUFFALO, Aug. 20.—Curtiss-Wright Corporation, Buffalo, has been chartered under Delaware laws with capital of 12,000,000 shares of stock, no par value, to take over and consolidate Curtiss Aeroplane & Motor Co., with local plant at Vulcan and Kenmore Avenues, and Wright Aeronautical Corporation, Paterson, N. J., manufacturer of aircraft motors, merger becoming effective Aug. 15. New company plans immediate organization of aviation research corporation, with laboratories, shops, flying field, etc. C. M. Keys, heretofore head of Curtiss company, is president, and Charles L. Lawrence, vice-president.

Gordon F. Carr, 135 Chapin Street, Binghamton, N. Y., and associates have organized Carr Home Appliances Co., to operate a local plant for manufacture of electrical appliances and equipment. Ralph E. Cohee, 160 Chapin Street, is also interested in new company.

Houdaille-Hershey Corporation, 537 East Delavan Avenue, Buffalo, manufacturer of shock absorbers and other automobile equipment, has concluded negotiations for purchase of Skinner Co., Ltd., Gananoque, Ont., manufacturer of automobile bumpers and kindred products, and will consolidate with organization, operating as a Canadian subsidiary. Plans are under way for expansion in present Skinner plant, including installation of additional equipment, and for new plant at Oshawa, Ont., latter reported to cost more than $150,000 with equipment. Fred V. Skinner will continue as secretary and general manager of Skinner company.

Board of Education, Rochester, N. Y., plans installation of manual training equipment in proposed three-story addition to Washington junior high school on Clifford Avenue, reported to cost about $700,000, for which bids will soon be asked on general contract. Edward S. Gordon, 311 Alexander Street, is architect.

Stewart Motor Corporation, 93 Dewey Avenue, Buffalo, manufacturer of motor trucks, parts, etc., plans rebuilding of portion of repair shop recently destroyed by fire.

South Atlantic

BALTIMORE, Aug. 20. — Flynn & Emrich Co., 301 North Holliday Street, Baltimore, manufacturer of mechanical stokers, parts, etc., is said to be planning early call for bids for one-story foundry at Grantley Avenue and Western Maryland Railroad, reported to cost $75,000 with equipment. W. S. Austin, Maryland Trust Building, is architect and engineer. James F. Turner is general manager.

Virginia Electric & Power Co., 700 East Franklin Street, Richmond, has made application for permission to construct and operate a hydroelectric power plant on the Roanoke River, to be equipped for initial capacity of 25,000 kw. and ultimate output of 42,000 kw., reported to cost more than $1,000,000 with transmission system.

Toy & Specialty Mfg. Co., Richmond, Va., has been organized to take over and consolidate Berger Specialty Mfg. Co., 2008 East Main Street, and Bruner Lumber Co., Roane Street, manufacturer of light fabricated steel and other metal products, toys, aircraft landing apparatus, etc. Consolidated company will continue production at both plants, and plans immediate expansion with installation of additional equipment.

Platnick Brothers, Bluefield, W. Va., manufacturers of mechanical products, D. M. Platnick, head, are planning construction of one-story foundry at Big Stone Gap, Va., reported to cost about $24,000 with equipment.

City Council, Columbia, S. C., will receive bids until Aug. 27, for two horizontal piston pumping units, capacity of 3,500,000 gal. per day, with accessories. W. S. Tomlinson is city engineer.

Board of Education, Winston-Salem, N. C., has approved plans for two-story and basement high school, to cost about $225,000, and plans installation of manual training equipment. Northup & O'Brien, Starbuck Building, are architects.

J. Smith Lanier, president, West Point Telephone Co., West Point, Ga., is at head of project to construct and operate hydroelectric power plant on Chattahoochee River, near city, for which Federal permission has been granted. Station will have initial capacity of 15,000 kw. and ultimate output of 30,000 kw., and is reported to cost more than $500,000 with transmission lines. McDonald & Co., Atlanta, Ga., are engineers.

Curtiss Airports, Inc., 29 West Fifty-seventh Street, New York, has awarded general contract to Stone & Webster, Inc., 120 Broadway, and 49 Federal Street, Boston, for airport at Baltimore, including hangars, repair and reconditioning shops, oil storage and distributing units, and

other field structures, reported to cost more than $1,000,000 with equipment.

Chesapeake & Ohio Railroad Co., Richmond, Va., will not proceed with engine house and terminal shops at Elk, W. Va., at present time, recently noted in these columns.

Page County School Board, Luray, Va., is said to be planning installation of manual training equipment in proposed two-story high school, to cost about $160,000, for which it is purposed to ask bids on general contract early next month. Mims, Speake & Co., Luray, are architects.

B. F. Goodrich Co., Akron, Ohio, manufacturer of automobile tires and tubes, mechanical rubber goods, etc., is reported planning new mill at Atlanta, Ga., to be equipped for initial capacity of 10,000 tires and tubes a day, estimated to cost more than $1,200,000 with machinery. Company is completing construction of tire cord mill at Silvertown, near Thomaston, Ga., to cost more than $5,000,000, and proposes to have ready for service in fall.

Philadelphia

PHILADELPHIA, Aug. 20.—Contract has been let by Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, to Stone & Webster, Inc., 49 Federal Street, Boston, for two electric-operated coal breakers for central mine service in vicinity of Locust Summit, Pa., each to be equipped for capacity of 25,000 tons daily, and for complete electrification of mining properties throughout this district, estimated to cost about $20,000,000 with equipment.

Quaker Field Corporation, Philadelphia, care of P. J. Whelan, Bankers' Trust Building, recently organized under Delaware laws by Mr. Whelan and associates, plans construction of airport on 300-acre tract of land near Llanrich golf course, about six miles from center of city, to include hangars, repair and reconditioning shops, oil storage and distributing buildings, and other mechanical field units, reported to cost more than $1,000,000 with equipment.

Stokes & Smith Co., Wakeling Street and Summerdale Road, Philadelphia, manufacturer of paper box-making machinery, etc., has awarded general contract to Robert E. Lamb Co., 841 North Nineteenth Street, for one-story addition to be equipped as a grinding mill.

Frank M. Weaver & Co., Lansdale, Pa., plan rebuilding of portion of structural steel fabricating plant recently destroyed by fire with loss reported at $20,000 including equipment.

Rundle Mfg. Co., Cleveland Street, Milwaukee, manufacturer of plumbing equipment and supplies, is completing new Eastern branch plant on River Road, Delair, near Camden, N. J., consisting of one-story foundry, 150 x 325 ft.; three-story mill unit, 68 x 70 ft.; one-story enameling shop, 20 x 80 ft., and other structures, and plans early occupancy. A large part of output will be used for export. Entire project will represent investment of about $1,000,000. R. A. Wickland & Co., 205 West Wacker Drive, Chicago, are the engineers.

Joseph Stokes Rubber Co., Taylor and Webster Streets, Trenton, N. J., manufacturer of molded hard rubber goods, has filed plans for two one-story additions, 40 x 70 ft. and 36 x 58 ft. respectively, for which general contract recently was let to N. A. K. Bugbee & Co., 206 East Hanover Street.

Commissioner of Institutions and Agencies, State Office Building, Trenton, N. J., will receive bids until Aug. 27, for steel water tower and tank at Woodbine Colony for Feeble-Minded, Woodbine, N. J. Information at office of Division of Architecture and Construction, address noted.

Kellett Aircraft Co., care of Nicholas S. Ludington, 123 South Broad Street, Philadelphia, head of Central Airport, Camden, N. J., has been formed under Delaware laws and plans construction of new plant at airport noted for manufacture of special aircraft, for which patent license has been secured from Pitcairn-Cievra Autogiro Co., Land Title Building, Philadelphia, Harold F. Pitcairn, head. Initial unit will be one story and is reported to cost more than $65,000 with equipment.

Board of Education, Royersford, Pa., is considering installation of manual training equipment in new two-story junior and senior high school to cost about $230,000, for which bids will soon be asked on general contract. W. Marshall Hughes, 147 North Fifth Street, Reading, Pa., is architect.

Individual Drinking Cup Co., Easton, Pa., manufacturer of pressed paper drinking cups, etc., has asked bids on general contract for a three-story addition, reported to cost close to $100,000 with machinery. Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer.

Joseph Loeffler Machine Co., Philadelphia, has leased floor in building at 132 North Fourth Street for local works and headquarters.

Cleveland

CLEVELAND, Aug. 20.—While machine tool sales show a moderate decline as compared with July, business is regarded as good for this time of the year. The Cleveland Union Terminals Co. during the week distributed orders for nearly all the machinery required for its locomotive repair shops. Its inquiry was for about 25 machines. Other buying during the week was confined to single machines. No inquiry of size is pending. Business is well distributed among various industries. Deliveries have improved on some lines of drill presses, radial drills, lathes and grinders, but are still greatly deferred on some makes of planers and shapers. On large tools, no improvement in deliveries is reported.

Hoover Co., North Canton, Ohio, manufacturer of vacuum cleaners, etc., has awarded general contract to Warren-Hoffman Co., Witters Building, for four-story addition to cost about $100,000 with equipment. L. Christman and C. Firestone, 900 Renkert Building, Canton, are architects.

Tandem Wheel Co., Warren, Ohio, will establish a branch plant at Akron, Ohio. Portion of equipment will be removed from present works and additional machinery provided for increased output.

Canton Drop Forge & Mfg. Co., Canton, Ohio, is having plans drawn for one-story addition, 90 x 550 ft., reported to cost about $100,000 with equipment.

Apex Electrical Mfg. Co., 1067 East 152nd Street, Cleveland, manufacturer of electric-operated cleaning equipment, clothes washers, etc., has acquired plant and business of Johnson Washer Co., Oakland, Cal., manufacturer of kindred equipment, and will consolidate with organization. Oakland plant will be continued in operation for Pacific Coast trade and expansion carried out.

Whiteway Stamping Co., 1201 East Fifty-fifth Street, Cleveland, manufacturer of metal stampings, has awarded general contract to Boldt-Rapp Co., 6007 Euclid Avenue, for one and two-story plant on East Seventieth Street, estimated to cost $80,000 with equipment.

Williams Alloy Products Co., Elyria, Ohio, manufacturer of bearing metals, etc., is planning expansion and improvement program, including installation of additional equipment at local plant for larger output.

Goodyear Tire & Rubber Co., Akron, Ohio, has closed plant of subsidiary organization, Marathon Tire & Rubber Co., at Cuyahoga Falls, Ohio, and will remove this division to main Akron mills, where production will be concentrated in future.

Reliance Mfg. Co., Massillon, Ohio, manufacturer of lock nuts, lock washers, etc., has authorized an expansion and improvement program, including new one-story addition totaling about 10,000 sq. ft. floor space, with installation of heat-treating equipment, cutting, polishing and other machinery to be used for manufacture of new products of allied character. Work is reported to cost more than $70,000.

Crescent Engineering Co., 1215 West Bancroft Street, Toledo, Ohio, manufacturer of mechanical equipment, is having plans drawn for one-story plant unit at Dewey and Sylvania Avenues, reported to cost close to $35,000 with equipment. R. E. Dickman is head.

New England

BOSTON, Aug. 20.—New England tool builders report a further contraction in bookings. No new inquiries of importance have come into the market. General opinion is that sales will remain small for at least another month. Dealers, however, have a sizable number of prospects to work upon when the buying movement is resumed.

Contract has been let to Temple & Crane, Inc., Boston, for construction of the new power plant at Bristol, Conn., for the New Departure Mfg. Co. The main building will be of concrete, steel and brick, about 54 x 126 ft., with basement and one story high.

Chance Vought Corporation, aircraft, has completed plans for a one-story, 320 x 672 ft., manufacturing plant at East Hartford, Conn.

W. F. Gilbert, 127 Church Street, New Haven, Conn., has started work on a coal unloading plant. A grab bucket and other handling equipment is involved.

Leland-Gifford Co., 1027 Southbridge St., Worcester, Mass., machine tools, will soon start a one-story addition, 121 x 196 ft.

Sherms, Inc., 318 Warren St., Bridgeport, Conn., novelties, closed bids Aug. 20 for a one-story, 25 x 60 ft., manufacturing unit.

Marlboro Wire Goods Co., Lincoln Street, Marlboro, Mass., has started work on a manufacturing plant addition, to cost $45,000 without equipment.

Westerly, R. I., will close bids Aug. 26 for a two-story and basement junior high school and industrial school, to cost $500,000 without equipment.

Skayeff Ball Bearing Co., 330 New Park Avenue, Hartford, Conn., closes bids

Aug. 21 for a two-story, 75 x 150 ft., manufacturing plant and for alterations to another manufacturing unit.

Strathmore Paper Co., Front Street, Mittineague, Mass., is revising plans for a 54 x 60 ft. hydroelectric plant to be built at West Springfield, Mass.

Lux Clock Mfg. Co., 95 Johnson Street, Waterbury, Conn., has completed plans for a four-story, 45 x 140 ft., manufacturing plant addition.

Taylor & Fenn Co., Arch Street, Hartford, Conn., manufacturer of milling machines, drills, etc., has awarded general contract to Allyn Wadhams Co., 15 Lewis Street, for one-story addition to foundry, 54 x 180 ft., reported to cost close to $50,000 with equipment.

Segal Lock & Hardware Co., 155 Leonard Street, New York, with main plant at Brooklyn, has completed arrangements for purchase of Norwalk Lock Co., Norwalk, Conn., manufacturer of locks, builders' hardware, etc., and will consolidate with organization. It is proposed to continue acquired plant at present location with increased output.

Holyoke Water Power Co., Holyoke, Mass., has plans nearing completion for new hydroelectric power plant on its waterway, vicinity of mill of American Writing Paper Co., reported to cost $450,000 with equipment.

United Electric Railways Co., Woonsocket, R. I., has awarded general contract to O. D. Purington Co., Providence, R. I., for one-story service, repair and garage building, 107 x 175 ft., for company motor buses, at end of Park Avenue, reported to cost close to $100,000 with equipment.

Bolta Rubber Co., care of Eaton & Chandler, Lawrence, Mass., attorneys, representatives for company, has concluded negotiations for purchase of Mill No. 3A, of local Everett Mills, five story, totaling about 70,000 sq. ft. floor space, heretofore used for textile service, and will remodel and equip new plant for manufacture of hard rubber goods. Company will be incorporated under State laws with John Bolten as president, and Milton Shaw, vice-president.

Trumbull Electric Mfg. Co., Woodland Avenue, Plainville, Conn., manufacturer of electric switches, controls, etc., affiliated with General Electric Co., Schenectady, N. Y., is reported planning new addition to cost close to $50,000 with equipment.

Plant of Connecticut Telephone & Electric Co., Meriden, Conn., manufacturer of telephone equipment, electric fixtures, etc., in receivership for more than a year, has been closed for indefinite period, and will be offered at public sale at early date.

Board of Education, Norwalk, Conn., has authorized installation of manual training department, consisting of three shop units for machine, mechanical, electrical and other work, in new junior high school to cost in excess of $250,000 for which plans will be drawn by Frank Irving Cooper Corporation, 172 Tremont Street, Boston, architect.

United-Carr Fastener Corporation, Boston, has been organized to take over and consolidate United States Fastener Corporation, with local plant on Columbia Road, and Carr Fastener Co., 31 Ames Street, Cambridge, Mass., both manufacturers of metal fasteners, automatic machines for attaching fasteners, screw machine parts, etc. New company plans expansion program for enlarged output. M. F. Carr, formerly president of Carr company, will be chairman of board, and Sinclair Weeks, heretofore president of United States Fastener Corporation, will occupy same position with consolidated organization.

The Crane Market

BUILDERS of electric overhead cranes are well engaged on orders from the Middle West and have some business from the South, but the New York and New England districts are quiet. There is also a decided lull in the locomotive crane business. The S. G. Schaefer Iron Works, Edgewater, N. J., recently in the market for a locomotive crane for steel erection has purchased a used Brownhoist locomotive crane, which has been on the Pennsylvania Railroad. The International Combustion Engineering Co., 200 Madison Avenue, New York, is reported to have closed on a 25-ton locomotive crane.

In the Chicago district the Edison Electric Appliance Co., Chicago, is inquiring for a 10-ton, 60-ft. span electric traveling crane.

Among recent purchases are:

Rockford Drop Forge Co., Rockford, Ill., two 10-ton, 49-ft., 7¼-in. span, electric traveling cranes from Wisconsin builder.

Union Pacific System, 5 drop pits for roundhouse from unnamed builder.

Milwaukee

MILWAUKEE, Aug. 20.—All items of machine tools are still facing a heavy demand far exceeding that of any recent years and in spite of a barely noticeable recession which is considered to be merely seasonal. Deliveries have not been improved noticeably. The busiest of the metal working plants at this time appear to be the manufacturers of tractors, farm implements and electrical equipment. While automobile production has naturally fallen off, inquiries from that source promise a liberal volume of future purchases and manufacturers of automotive parts continue programs of expansion. Railroad demand has not attained volume.

Wisconsin Malleable Iron Co., 94 South Bay Street, Milwaukee, plans rebuilding and re-equipment of parts of its plant damaged by fire Aug. 14. The boiler house, pattern shop, carpenter shop, core room, annealing house and shipping room are affected. W. H. Osborne is president.

Sherwood Mfg. Co., Hudson, Wis., originally of Minneapolis, producer of washing equipment, will move to the plant of the Northern States Power Co., Chippewa Falls, Wis., occupied by that concern during the construction of its hydroelectric plant in that city. George Sherwood is president.

Specialty Brass Co., Kenosha, Wis., maker of creamery fittings and milk pumps, will move its plant in Albany, N. Y., to Kenosha to secure concentration of all production, which will be increased 30 per cent thereby. Last year, the Albany plant produced $100,000 worth of equipment. Appliances for a new milk heating device, said to be revolutionary in the dairy industry, will be an added line. C. M. Anderson is president.

Fish Rotary Oven Co., Beloit, Wis., has completed removal of plant and offices to that city from Walworth. The new plant cost above $100,000 and includes a main shop, 100 x 210 ft., and a foundry with cupola and electric traveling crane. Three to four bakers' ovens a week will constitute the initial output. G. W. Curless is president, and George K. Blakely is secretary-treasurer.

West Allis, Wis., announces that the Pittsburgh-Des Moines Steel Co., 38 South Dearborn Street, Chicago, was the low bidder for furnishing and installing 1,000,000-gal. elevated steel tank for municipal water works at a cost of $70,700.

Kiel, Wis., will take sealed bids until Aug. 29 for construction of concrete reservoir and addition to pumping station, including furnishing of one 750-gal. and one 300-gal. centrifugal pump, air compressor and air lift pump. W. G. Kirchoffer, 22 N. Carroll Street, Madison, Wis., is designing engineer.

E. H. Krueger, Twenty-fifth and Cleveland Avenues, Milwaukee, has secured permit to build a one-story machine shop addition, 60 x 120 ft., at 1123 Cleveland Avenue, to cost about $30,000.

Pittsburgh

PITTSBURGH, Aug. 20.—The machine tool business continues to be good, and the constant flow of inquiries is surprising to most dealers who ordinarily expect a quiet August. Purchases are confined largely to single tools. The Westinghouse Electric & Mfg. Co. placed a number of items last week, but still has a large part of its third quarter list to buy. The Bethlehem Steel Co. has not yet closed against its inquiries for the Johnstown, Pa., plant, but immediate action is expected.

Work is progressing rapidly on the new seamless tube mill of the National Tube Co. at McKeesport, Pa., and tools and equipment will probably be placed in the fall. The cranes for this job will likely be ordered this week. Requirements of the Austin Motor Co. for its Butler, Pa., plant are not expected to be large, as the present plans of the company call for assembling of motor cars only and the plant will be extended slowly in the early days of operation.

Aetna-Standard Engineering Co., Youngstown, Ohio, manufacturer of rolling machinery, etc., has awarded general contract to J. H. DeCarpentier & Son, 327 Falls Avenue, for two one-story additions to branch plant at Ellwood City, Pa., reported to cost about $45,000.

Kerotest Mfg. Co., 2525 Liberty Avenue, Pittsburgh, manufacturer of oil well equipment and supplies, valves, etc., has superstructure in progress for a four-story addition, reported to cost close to $100,000 with equipment.

Farman Aircraft Co., care of Harrison R. Tucker, Tulsa, Okla., recently formed as an affiliated interest of Farman Brothers, Paris, France, manufacturers of large aircraft, is planning early construction of new plant in vicinity of Wheeling, W. Va., for manufacture of aircraft, motors, parts, etc., reported to cost more than $75,000 with equipment. Company also proposes to establish eastern assembling works and has taken options on site at Central Airport, Camden, N. J., for this plant.

Fairmont Mfg. Co., Fairmont, W. Va., is said to be planning expansion in duralumin sheet manufacturing plant, primarily for metal aircraft production, to include installation of rolling mill equipment, electric furnace and auxiliary equipment, reported to cost more than $75,000.

Kelly-Claude Neon Corporation, 231 Spahr Street, Pittsburgh, has been organized to take over and consolidate Alpha-Claude Neon Light Co., address noted, and Kelly Outdoor Advertising Co., Erie, Pa., to manufacture luminous tube electric signs, lamps, etc. Expansion plans are under way for increase in present production.

United States Engineer Office, Pittsburgh, will receive bids until Sept. 9 for a hydroelectric plant for Deadman Island Locks, Ohio River.

Board of Education, Blairsville, Pa., is considering installation of manual training equipment in proposed two-story high school, reported to cost about $220,000, for which bids will soon be asked on general contract. Vans Engineering Service, Blairsville, is architect and engineer.

General Bronze Co., 3212 Smallman Street, Pittsburgh, has concluded arrangements for purchase of Guaranty Iron & Steel Co., 3847 West Lake Street, Chicago, and Wisconsin Ornamental Iron & Bronze Co., Milwaukee, and will consolidate with organization. Proposed to continue plants at present locations and will carry out expansion program for increased output. Company is making improvements at Pittsburgh works, including installation of additional equipment.

Chicago

CHICAGO, Aug. 20.—The placing of orders for the "Farmall" tractor plant of the International Harvester Co. at Rock Island, Ill., features the activity in the machine tool trade. Purchases of special purpose tools have been virtually completed and the buying of standard machines is under way. Total expenditures for machine tools will be nearly $500,000. In addition, a large outlay will be made for foundry equipment. The improvements are being made to increase the output of tractors 40 per cent and the production of gasoline engines 25 per cent.

Purchases of machine tools for tractor plants have been an important factor in the local machinery market throughout the year, accounting for 25 to 60 per cent of dealers' total sales. Although a few instances of overexpansion in the farm equipment field are reported, they are not of an alarming character. In fact, one important producer of tractors now has nearly enough foreign business to occupy its plants without depending on domestic orders.

Another important source of business in machine tools has been the rapidly increasing output of talking motion picture equipment by the Western Electric Co. Orders have not only come in large numbers from that company but from a wide range of shops to which it has been compelled to farm out work. Production of this cinema improvement is still far short of the demand.

General business in machine tools is still well diversified and in encouraging volume, although showing the effects of the vacation season. For a number of leading dealers business to date this year has been at the highest rate in history, not excepting the war period and the post-war boom. Sales of one machinery house in the first seven months were within striking distance of the total for all of 1928.

Purchases by automobile companies are confined to scattered orders for tools to round out existing equipment. Railroad buying has not been conspicuous of late, and it is common opinion that no large programs will be launched in the near future. Leading Western lines have brought their shops up to a high standard of efficiency in recent years, and the O'Fallon decision has removed a potent reason for converting extra earnings into improvements.

Chicago, Milwaukee, St. Paul & Pacific has closed for two frog and switch planers for its Milwaukee shops.

Union Pacific System has placed orders for five drop pits for roundhouses.

Continental Can Co., Chicago, is spending $1,000,000 at its plant in the Clearing district. Improvements include additions to can plant, warehouse and tin mill. A lacquering plant will also be erected.

Edison Electric Appliance Co., Chicago, will soon start work on a one-story warehouse and manufacturing plant at South Menard Avenue and Taylor Street, to cost $400,000.

International Harvester Co., Chicago, is erecting a one-story steel storage building, 188 x 199 ft., at 1015 West 120th Street, to cost $68,000.

Heuser Mfg. Co., maker of screw machine products, 231 West Illinois Street, Chicago, has purchased a two-story and basement plant building at 1638 North Paulina Street.

Hawkeye Mfg. Co., maker of portable hog houses, brooder houses and self-feeders, Belmond, Iowa, has started building a new plant, 70 x 100 ft., to replace one recently destroyed by fire.

Elgin Stove & Oven Co., Elgin, Ill., will construct an addition, 48 and 82 ft. x 124 ft., to cost $10,000.

Michiana Products Corporation, Michigan City, Ind., has been organized to take over the Chrobaltic Tool Co. and the Sheet Steel Products Co., both of Michigan City. The Chrobaltic division will continue to manufacture heat and acid-resisting alloy castings, including stainless materials, and the Sheet Steel Products division will continue to make the Hall-Winslow line of oil filters and air cleaners for truck, tractor, airplane and automobile engines, as well as pressed metal parts, tanks, equipment, etc. O. M. Carry is president of the new company, with office at Chicago. W. B. Sullivan, first vice-president and general manager, has headquarters at Michigan City.

Clark Equipment Co., Buchanan, Mich., will soon construct an addition, 100 x 220 ft., to its tubular housing department.

Midway Foundry Co., St. Paul, Minn., will erect an addition to its foundry on Raymond Avenue, at a cost of $3,300.

Dallas Brass & Copper Co., 6601 Grand Avenue, Chicago, has awarded general contract to Dahl & Stedman, 11 South LaSalle Street, for one-story addition, 126 x 329 ft., reported to cost about $500,000 with equipment. Johnch & Ehmann, 140 South Dearborn Street, are architects.

Scully Steel & Iron Co., 208 South LaSalle Street, Chicago, has let contract to Boyle & Co., 105 West Monroe Street, for one-story storage and distributing plant at 2364 South Ashland Avenue, estimated to cost more than $50,000 with equipment.

Vortex Mfg. Co., Western and Austin Avenues, Chicago, manufacturer of paper drinking cups, etc., pressed paper goods and kindred specialties, has disposed of a stock issue to total $4,579,000, a portion of proceeds to be used for expansion. P. T. Potts is president.

City Council, Grafton, N. D., has called a special election to approve a bond issue of $77,000, fund to be used for a municipal electric light and power plant. Druar & Milinowski, Globe Building, St. Paul, Minn., are engineers.

Northwestern Re-Tinning Co., Hersey and Hampden Avenues, St. Paul, Minn., has leased a one-story building to be erected at 862 Seal Street, and will occupy for a new plant, reported to cost close to $25,000 with equipment. Mather & Fleishbein, Endicott Building, are architects.

Union Pacific Railroad Co., Omaha, Neb., has plans for a new engine house with shop facilities at Cheyenne, Wyo., estimated to cost about $40,000 with equipment. L. D. Huntley, Omaha, is chief engineer.

Board of Education, Burlington, Iowa, is considering installation of manual training equipment in new two-story junior high school on Oak Street, estimated to cost $240,000, for which plans will be drawn by C. L. Ritts, Eisfeld Building, architect.

Mercil Plating Co., 1911 Fulton Street, Chicago, manufacturer of plated metal products, has awarded contract to H. N. Samuel, 53 West Jackson Boulevard, for one-story addition, 20 x 101 ft., reported to cost about $30,000 with equipment.

Rockford Drop Forge Co., Ninth Street, Rockford, Ill., has awarded contract to Linden & Sons, Inc., 1110 Tenth Street, for one-story addition, 85 x 275 ft., reported to cost close to $150,000 with equipment. Lockwood Greene Engineers, Inc., 400 North Michigan Avenue, Chicago, is architect and engineer.

Iowa Railway & Light Co., Cedar Rapids, Iowa, will build a one-story power plant at Jefferson, Iowa, reported to cost in excess of $45,000 with equipment.

Central West Public Service Co., 117 North Thirteenth Street, Omaha, Neb., operating electric light and power properties in Iowa, Minnesota, North and South Dakota, is disposing of a note issue of $1,000,000, portion of proceeds to be used for expansion in power facilities and transmission system.

St. Louis

ST. LOUIS, Aug. 20.—Plans are being considered by Eagle Motor Truck Corporation, 6150-60 Bartmer Avenue, University City, Mo., for new one-story plant for parts production and assembling, reported to cost more than $65,000 with equipment. J. P. Reis is head.

Tunnison Brothers, 1530 West Main Street, Oklahoma City, Okla., manufacturers of sheet metal products, have begun construction of new one-story plant, 100 x 300 ft., at 513 North Indiana Street, reported to cost in excess of $70,000 with equipment.

Board of Education, Crawford, Neb., is said to be planning installation of manual training equipment in proposed two-story

high school, to cost about $160,000, for which bids will be asked on general contract early in September. Meginnis & Schaumberg, Federal Trust Building, Lincoln, Neb., are architects.

Precision Machinery Co., Seattle, Wash., is considering new branch plant unit at Centralia, Mo., for manufacture of rotary pumping machinery, parts, etc. Negotiations are under way with Centralia Chamber of Commerce for suitable site.

Rex Art Casket Co., 1608 North Thirteenth Street, Kansas City, Kan., has plans for a two-story and basement addition, 50 x 125 ft., reported to cost close to $25,000 with equipment.

Cincinnati

CINCINNATI, Aug. 20.—A slight letup in the demand for machine tools during the past month is aiding district tool builders to diminish their large amount of unfilled orders, which will require about two and a half months' production to fill. Despite this easing off in demand, total fresh bookings during July were 27 per cent higher than July, 1928, and reflected the continued widening of interest in new equipment and replacements in practically all lines of industry. So far, August bookings are a trifle under those of July, although in certain quarters manufacturers report that new business this month is better than that of July. This, however, is not sufficient to affect the market generally. The Missouri and Pacific Railroad is reported to be in the market for three motor-driven lathes.

Ohio Pattern Works & Foundry Co., 2730 Spring Grove Avenue, Cincinnati, has awarded general contract to William Juergens & Son, 4434 Glenway Avenue, for one-story foundry addition, reported to cost close to $40,000 with equipment.

General Motors Corporation, General Motors Building, Detroit, has concluded negotiations for purchase of plant and business of Day-Fan Electric Co., Dayton, Ohio, manufacturer of radio equipment and parts, and will operate as unit of organization in future. Expansion is planned for increased output.

Exact Weight Scale Co., 265 West Spring Street, Columbus, Ohio, is having plans drawn for one-story plant unit on West Fifth Street, estimated to cost $65,000 with equipment. Carmichael & Milsbaugh, 8 East Long Street, are architects; bids will soon be asked on general contract.

Columbia Gas & Electric Corporation, Cincinnati, is negotiating for purchase of Binghamton Gas Works, Inc., Binghamton, N. Y., and will operate in conjunction with present properties at Olean, N. Y., and vicinity. Plans are under way for expansion in natural gas holdings in that district, including construction of pipe lines to Binghamton and neighboring districts. Columbia company has also acquired controlling interest in Cincinnati, Newport & Covington Light & Traction Co., operating at Newport and Covington, Ky., and in Cincinnati Gas Transportation Co., and plans extensions and improvements in plants and system.

Second National Garage, Inc., Nashville, Tenn., recently organized by E. B. Craig, National LIfe & Accident Insurance Co., 301 Seventh Avenue, and associates, has awarded general contract to John Oman, Jr., Chamber of Commerce Building, for five-story service, repair and garage building, 100 x 200 ft., at Polk Avenue and Seventh Street, estimated to cost in excess of $500,000 with equipment. Hart, Freeland & Roberts, Independent Building, are architects.

Advance Battery Mfg. Co., Louisville, has awarded general contract to National Concrete Construction Co., Louisville, for one-story addition on East Lee Street, reported to cost close to $20,000 with equipment.

Indiana

INDIANAPOLIS, Aug. 20.—Hetherington & Berner, fabricators of structural steel and manufacturers of dredging machinery, with factory in Indianapolis, has been acquired by the Berner interests, represented by Robert Berner. Mr. Berner has taken over the operation of the plant.

Extensive remodeling now is under way at the plant and the personnel of the Robert Berner Structural Steel Co. has been transferred to the Hetherington & Berner plant. The Berner plant will be sold. Hetherington & Berner plant includes structural steel fabrication plant, machine shop, pattern-making shop and foundry. Officers of the new corporation will be Mr. Berner, president; R. H. Dickson, vice-president, and F. C. Miller, secretary-treasurer.

Real estate and other property of the Wayne Machinery Co., Fort Wayne, Ind., has been sold to C. L. Schust, Walter Meyer and Clifford Kern for $24,000, subject to approval of the trustee in bankruptcy. Mr. Schust of the C. L. Schust Co. said he would move his sheet metal business to the plant and will lease a part of the building to Meyer and Kern, who will carry on business similar to that of the Wayne Machinery Co. under the name of the Indiana Machinery Co.

Land on New Haven Avenue, Fort Wayne, Ind., has been acquired by George A. Jacobs and Wendell C. Glass, former officials of the Dudlo Manufacturing Corporation there, and their new associates as the site for an industrial plant they will erect for the manufacture of wire of all kinds. An office building has been started. The first unit of the plant will be 200 x 300 ft.

Titan Electric Co., Butler, Ind., manufacturer of electrical equipment, has arranged for removal of plant to Adrian, Mich., where increased capacity will be carried out.

Auburn Automobile Co., Auburn, Ind., has secured a substantial interest in Columbia Axle Co., 850 East Seventy-second Street, Cleveland, manufacturer of automobile axles, etc., and will be active in management in future. Proposed to expand output for axles for new Cord automobile. E. L. Cord, president of Auburn company, will be chairman of board of Columbia organization, and Edwin H. Parkhurst, heretofore vice-president and manager of last-noted company, will be president.

Tokheim Oil Tank & Pump Co., 1602 Wabash Avenue, Fort Wayne, Ind., manufacturer of gasoline pumps and equipment, has asked bids on general contract for one and two-story addition, 30 x 800 ft. and 40 x 160 ft., reported to cost about $100,000 with equipment. Pohlmeyer & Pohlmeyer, Central Building, are architects.

Rubush & Hunter, American Central Life Insurance Building, Indianapolis, architects, have plans for a new seven-story automobile service, repair and garage building, 68 x 195 ft., at 147 East Market Street, estimated to cost $500,000 with equipment.

Noblitt-Sparks Industries, Inc., 603 East Washington Street, Indianapolis, manufacturer of metal products, has approved plans for an addition to plant at Glenwood, Ind., reported to cost over $50,000 with equipment.

Gulf States

BIRMINGHAM, Aug. 20.—Kansas City Southern Railroad Co., Beaumont, Tex., with main offices at Kansas City, Mo., is arranging for new terminal yards and shops at Dowling, near Beaumont, including engine house, machine shops, boiler shops and other units, entire project to cost close to $1,000,000 with equipment. Company engineering department is in charge.

Lamson & Sessions Bolt Co., 1971 West Fifty-eighth Street, Cleveland, has awarded contract to Johnson Construction Co., Marlin Building, Birmingham, for new plant at North Birmingham, consisting of several one-story units, with main mill, 160 x 240 ft., power house and other buildings, entire project to cost close to $500,000 with equipment. George S. Rider, Century Building, Cleveland, is engineer.

St. Louis & Southwestern Railroad Co., Tyler, Tex., plans rebuilding of portion of local car repair shops, recently destroyed by fire with loss reported at close to $50,000, including equipment.

Pacific Coast

SAN FRANCISCO, Aug. 20.—Plans are being completed by Neilson Steel Aircraft Co., Second and Camelia Streets, Berkeley, Cal., for two-story addition, 60 x 200 ft., reported to cost about $65,000 with equipment. Engineering department of company is in charge. Thomas Neilson is president.

Southern California Edison Co., Los Angeles, has made application for permission to issue bonds in amount of $15,000,000, portion of fund to be used in connection with extensions and improvements in electric light and power properties. Plans have been approved for a power substation at Compton to cost about $200,000 with equipment, and for similar unit at Moneta, to cost approximately $50,000.

Western Metal Products Co., 1160 Bryant Street, San Francisco, has awarded general contract to R. C. Stickle, South San Francisco, for one-story plant at South San Francisco, estimated to cost about $35,000 with equipment. Engineering department of company is in charge.

Inland Light & Power Co., Portland, Ore., has secured permission from Federal Power Commission to construct and operate a hydroelectric generating plant on Lewis River, vicinity of Woodland, Wash., to develop a total capacity of 170,000 hp., estimated to cost about $20,000,000, including steel tower transmission system.

Boeing Airplane Co., Seattle, has approved plans for extensions in plant to increase present floor area from 300,000 to about 400,000 sq. ft., new units to be used for parts production and assembling, reported to cost more than $250,000 with equipment. J. G. Johnson is president.